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ABSTRACT

This task-based curriculum guide for medical laboratory assistant is intended to help the teacher develop a classroom management system where students learn by doing. Introductory materials include a Dictionary of Occupational Titles job code and title sheet, a career ladder, a matrix relating duty/task numbers to job titles, and a task list. Each task is then outlined in this format: statement of duty, statement of task, duty and task numbers, a checklist of achievement of competence, specification of required tools and equipment and resources, and lists of teacher activities and student learning activities. The tasks are categorized by 15 duties: employing laboratory safety procedures, communicating with employees and patients, using basic laboratory skills, operating laboratory equipment, collecting specimens, providing care and maintenance of equipment and supplies, preparing specimens for analysis, performing hematologic procedures, performing urinalysis, performing chemistry analysis, performing microbiology procedures, performing serologic procedures, performing blood bank procedures, performing clerical duties, and using employability skills. Other contents include student and class achievement records, tool/equipment lists, a bibliography, and Board of Registry information provided by the American Society of Clinical Pathologists. (YLB)

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INTRODUCTION

This curriculum was developed through a grant awarded to the Department of Agricultural and Extension Education (AEE), College of Agriculture and Natural Resources, Michigan State University by the Vocational-Technical Education Service of the Michigan Department of Education (V-TES/MDE). While development of the curriculum was the responsibility of AEE, every attempt was made to involve people representing education and industry. The final curriculum is representative of the tasks health care workers perform on the job.

The credit for this curriculum belongs to (1) the V-TES/MDE consultant responsible for the program area; (2) a task force leader hired to do the writing; (3) a number of individuals from business, industry, and education who reviewed task statements, achievement indicators, and criteria statements to determine their relevancy to tasks performed by health care workers on their jobs in the world of work; and (4) the project coordinator from AEE.

The following describes the role of each of those credited above in developing the curriculum.

1. The V-TES/MDE curriculum consultant provided overall guidance for the project. This responsibility included nominating the task force leader, the task force members and working with AEE staff to determine the direction for the final curriculum.

2. The task force leader was responsible for all the writing activities. This person drew upon her professional expertise and other resources to develop the curriculum.

3. A task force composed of representatives of education, business and industry reviewed the curriculum and suggested appropriate changes. The final curriculum is the result of the close cooperation between the task force leader and the members of the task force.

4. The project coordinator in AEE was responsible for developing the format of the curriculum, working with the task force leader to ensure the quality of the curriculum, as well as that the final curriculum was produced on schedule. The work of the project coordinator was made considerably easier because of the close collaboration of the V-TES/MDE curriculum consultant. This whole effort was a partnership and could not have been completed without this arrangement.

Finally, the secretaries and other support staff who typed and proofread the final product cannot be overlooked. Without their assistance this effort would never have been completed.

It is intended by all those involved in the development of this curriculum that it always be used to provide relevant training for entry to the world of work. It is hoped that this curriculum is used to that end.

The curriculum guide is representative of the occupational job duty categories which list major activities and tasks performed on an entry level job. The curriculum guide contains a resource list and criteria statements which indicate the minimum standards of performance accepted as evidence of competence in completion of the task by the health care industry. This is a task-based curriculum guide which helps a teacher develop a classroom management system where students learn by doing. It is based on task analysis and reflects the skills, knowledge, and attitudes that employers expect incumbent workers to possess.

The Michigan Department of Education, Vocational-Technical Education Service has adopted descriptions and codes for vocational-technical education programs found in the document entitled, "A Classification of Instructional Programs" (C.I.P.), National Center for Educational Statistics, February, 1981. This new coding system is required of all states in

reporting data on all programs receiving funds under P.L. 94-482, the Vocational Education Amendments of 1976.

The United States Office of Education (U.S.O.E.) coding system was discontinued at the conclusion of the 1981-82 school year.

The C.I.P. code system for the Allied Health Occupations programs begins with 17.00 - The C.I.P. Code for curriculum tasks included in this curriculum guide is 17.0300, Course I.

The Health Occupations Students of America (HOSA) is the official student organization for students enrolled in vocationally reimbursed Health Occupations programs. The Michigan Association of Health Occupations Students of America provides opportunities for students to develop leadership, occupational, and social skills through involvement at the local, state, and national levels. HOSA activities are conducted as an integral part of the Health Occupations programs. Many of the tasks outlined in this guide are included in the skills competition conducted by HOSA at the regional, state, and national levels.

The following person was instrumental in the development of this curriculum:

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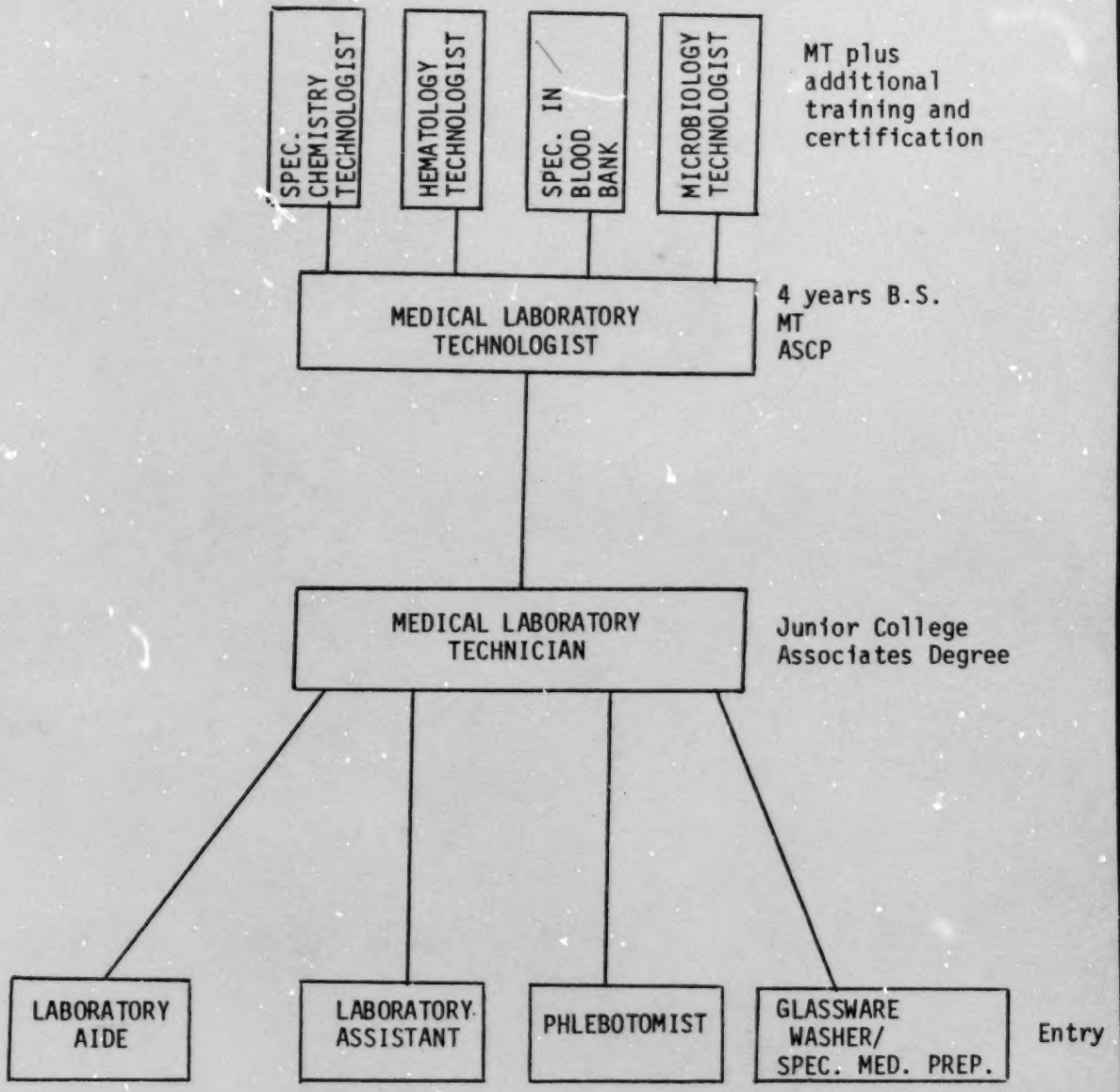
D.O.T. JOB CODE AND TITLE SHEET

MEDICAL LABORATORY ASSISTANT

D.O.T. NUMBER	JOB TITLE
078.687-010	Lab Aide
	Lab Assistant
	Phlebotomist
	Glassware Washer/Preparer
	Medical Technician
	Medical Technologist
	Chemistry Technologist
	Hematology Technologist
	Specialist in Blood Bank
	Microbiologist Technologist

MEDICAL LABORATORY ASSISTANT
CAREER LADDER



+ = Assoc. Degree + Clinical Training
# = Assoc/B.S. Degree + Clinical Training

DUTY/TASK - JOB MATRIX

DUTY/TASK NUMBERS	LAB AIDE	LAB ASSISTANT	GLASSWARE WASHER	PHLEBOTOMIST	MED. LAB. TECH. +	MED. LAB. TECHNOLOGIST #	CHEM. TECHNOLOGIST (CLIN. CHEMIST) #	HEMAT. TECHNOL (MED. HEMAT.)	SPEC. IN BLOOD BANK	MICROBIOLOGY TECH. (MICROBIOL.)
A-1	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X
B-1		X		X	X	X	X	X	X	X
2	X	X		X	X	X	X	X	X	X
3	X	X		X	X	X	X	X	X	X
4	X	X		X	X	X	X	X	X	X
5	X	X		X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X
C-1	X	X		X	X	X	X	X	X	X
2	X	X			X	X	X	X	X	X
3	X	X			X	X	X	X	X	X
4	X	X			X	X	X	X	X	X
5	X	X			X	X	X	X	X	X

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C-6		X	X			X	X	X	X	X	X
7		X	X			X	X	X	X	X	X
8		X	X			X	X	X	X	X	X
9		X	X			X	X	X	X	X	X
10		X	X			X	X	X	X	X	X
11		X	X			X	X	X	X	X	X
12		X	X			X	X	X	X	X	X
13			X			X	X	X	X	X	X
14			X			X	X	X	X	X	X
15		X	X			X	X	X	X	X	X
16			X			X	X	X	X	X	X
17			X			X	X	X	X	X	X
D-1		X	X			X	X	X	X	X	X
2			X			X	X	X	X	X	X
3			X			X	X	X	X	X	X
4		X	X			X	X	X	X	X	X
5			X			X	X	X	X	X	X

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E-1		X		X	X	X	X	X	X	X
2		X		X	X	X	X	X	X	X
3		X		X	X	X	X	X	X	X
4		X		X	X	X	X	X	X	X
F-1		X			X	X	X	X	X	X
2		X			X	X	X	X	X	X
3		X			X	X	X	X	X	X
4	X	X			X	X	X	X	X	X
5	X	X			X	X	X	X	X	X
6	X	X		X	X	X	X	X	X	X
7	X	X			X	X	X	X	X	X
8		X			X	X	X	X	X	X
9	X	X			X	X	X	X	X	X
10	X	X			X	X	X	X	X	X

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G-1		X			X	X	X	X	X	X
2		X			X	X	X	X	X	X
3		X			X	X	X	X	X	X
4		X			X	X	X	X	X	X
5		X			X	X	X	X	X	X
6		X			X	X	X	X	X	X
7		X			X	X	X	X	X	X
8		X			X	X	X	X	X	X
H-1		X			X	X	X	X	X	X
2					X	X	X	X	X	X
3					X	X	X	X	X	X
4					X	X	X	X	X	X
5					X	X	X	X	X	X
6		X			X	X	X	X	X	X
7		X			X	X	X	X	X	X
8					X	X	X	X	X	X
9		X			X	X	X	X	X	X
10					X	X	X	X	X	X

DUTY/TASK NUMBERS

12

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DUTY/TASK - JOB MATRIX

DUTY/TASK NUMBERS	JOB TITLES	LAB AIDE	LAB ASSISTANT	GLASSWARE WASHER	PHLEBOTOMIST	MED. LAB. TECH. +	MED. LAB. TECHNOLOGIST #	CHEM. TECHNOLOGIST (CLIN. CHEMIST) #	HEMAT. TECHNOL (MED. HEMAT.)	SPEC. IN BLOOD BANK	MICROBIOLOGY TECH. (MICROBIOL.)
H-11						X	X	X	X	X	X
12						X	X	X	X	X	X
13						X	X	X	X	X	X
14			X			X	X	X	X	X	X
15						X	X	X	X	X	X
16						X	X	X	X	X	X
17											
I-1			X			X	X	X	X	X	X
2			X			X	X	X	X	X	X
3			X			X	X	X	X	X	X
J-1			X			X	X	X	X	X	X
2						X	X	X	X	X	X
3						X	X	X	X	X	X
4						X	X	X	X	X	X
5			X			X	X	X	X	X	X
6						X	X	X	X	X	X
7						X	X	X	X	X	X
8			X		X	X	X	X	X	X	X

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J-9						X	X	X	X	X	X
10						X	X	X	X	X	X
11						X	X	X	X	X	X
12						X	X	X	X	X	X
13						X	X	X	X	X	X
14						X	X	X	X	X	X
15						X	X	X	X	X	X
16						X	X	X	X	X	X
K-1		X	X			X	X				X
2		X	X			X	X				X
3			X			X	X				X
4			X			X	X				X
5							X				
6						X	X				X
7							X				X
8							X				X
9			X			X	X				X
10		X	X	X		X	X				X

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K-11			X			X	X				X
12			X			X	X				X
13						X	X				X
14			X			X	X				X
15						X	X				X
16			X			X	X				X
17						X	X				X
18						X	X				X
L-1						X	X				
2						X	X				
3						X	X				
4			X			X	X				
5			X			X	X				
6						X	X				
M-1			X			X	X			X	
2						X	X			X	
3						X	X			X	

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M-4					X	X			X	
5		X			X	X			X	
6					X	X			X	
7					X	X			X	
8									X	
9		X		X	X	X			X	
10		X			X				X	
11		X		X	X				X	
N-1		X		X	X	X	X	X	X	
2		X		X	X	X	X	X	X	
3		X		X	X	X	X	X	X	
4		X		X	X	X	X	X	X	
5		X		X	X	X	X	X	X	
6		X		X	X	X	X	X	X	
0-1	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X

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0-4	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X
13	X	X	X	X	X	X	X	X	X	X
14	X	X	X	X	X	X	X	X	X	X
15	X	X	X	X	X	X	X	X	X	X
16	X	X	X	X	X	X	X	X	X	X
17	X	X	X	X	X	X	X	X	X	X
18	X	X	X	X	X	X	X	X	X	X
19	X	X	X	X	X	X	X	X	X	X
20	X	X	X	X	X	X	X	X	X	X
21	X	X	X	X	X	X	X	X	X	X

TASK LIST FOR LABORATORY DIAGNOSTIC SERVICES: MEDICAL LABORATORY ASSISTANT

A. EMPLOYING LABORATORY SAFETY PROCEDURES

1. Select safety supplies, using knowledge of laboratory task, to ensure personal protection.
2. Operate safety equipment, using knowledge of safety procedures, to provide personal/environmental protection.
3. Employ precautions, using knowledge of safety procedures, to handle hazardous reagents.
4. Employ precautions, using knowledge of safety procedures, to handle hot materials.
5. Employ precautions, using knowledge of safety procedures, to handle sharp objects.
6. Employ precautions, using knowledge of safety procedures, to prevent contamination.

B. COMMUNICATING WITH EMPLOYEES AND PATIENTS

1. Introduce self, using a knowledge of verbal and nonverbal communication, to interact with a patient.
2. Take a message, using an intercom, to communicate information.
3. Place a call, using a telephone and a knowledge of standard business telephone manners, to communicate information.
4. Answer a telephone, using a knowledge of standard business telephone manners, to communicate information.
5. Demonstrate verbal/non-verbal communication skills, using knowledge, to intereact with a patient.
6. Demonstrate professional conduct, using knowledge, to maintain successful employment relationships.

C. USING BASIC LABORATORY SKILLS

1. Select laboratory glassware, using knowledge of function, to perform laboratory procedures.
2. Perform basic calculation(s), using knowledge of laboratory mathematics, to determine quantities required for test performance.
3. Weigh out chemical reagents, using laboratory balances, to prepare solutions.

C. USING BASIC LABORATORY SKILLS (continued)

4. Measure volume of clinical material or laboratory solutions, using appropriate laboratory containers, to prepare solutions or specimens for laboratory tests.

5. Measure length of area, using appropriate measuring devices, to provide size or dimension information required for laboratory work.

6. Mix chemical(s), using standard laboratory equipment and chemicals, to prepare reagents, solutions or stains.

7. Store prepared solution(s) and stains, using knowledge of their properties, to maintain them in optimal condition.

8. Use commercial pH indicator paper to determine the acidic/basic levels of a solution.

9. Operate a pH meter, using appropriate equipment, to determine the acidic/basic level of a solution.

10. Measure length, using a metric ruler, to obtain size or dimension information.

11. Measure temperature, using a laboratory thermometer, to determine degree of heat.

12. Check alcohol reagents, using an alcohol hydrometer, to determine percentage of solution.

13. Use a compound microscope, using knowledge of resolution, to examine specimen slides.

14. Focus with oil immersion lens, using knowledge of refraction, to obtain maximum magnification.

15. Clean laboratory glassware, using appropriate cleaning materials and techniques, to ensure reliable results.

16. Separate substances by filtration, using knowledge of porosity and acid/base reactions, to obtain residue on filtrate.

17. Titrate solutions, using knowledge of acids and bases, to obtain a precise pH.

D. OPERATING LABORATORY EQUIPMENT

1. Operate Bunsen/Fisher burner, using safety precautions, to obtain flame of maximum intensity.

2. Calibrate burette, using knowledge of temperature/volume relationship, to prepare cure.

3. Weigh with balances, using knowledge of metrics, to obtain results within + 0.01 g.

D. OPERATING LABORATORY EQUIPMENT (continued)

4. Operate centrifuge, using knowledge of specimen requirements, to separate solids from liquids.

5. Operate timing device, using activator arm, to indicate correct intervals.

E. COLLECTING SPECIMENS

1. Select blood collection equipment, using laboratory request slips and knowledge of test requirements, to prepare to collect blood specimens.

2. Collect specimen(s), using knowledge of test requirements and necessary collection equipment, to obtain clinical specimens for laboratory testing.

3. Obtain blood sample, using appropriate venipuncture and capillary puncture supplies, to provide a blood specimen for a laboratory test.

4. Obtain a blood sample, using capillary puncture supplies, to provide a blood specimen for a laboratory test.

F. PROVIDING CARE AND MAINTENANCE OF EQUIPMENT AND SUPPLIES

1. Prepare laboratory equipment, using proper tools and knowledge of equipment operation procedures, to conduct laboratory testing.

2. Perform maintenance procedures and minor repairs, using proper tools and accessories, to ensure optimal working condition.

3. Perform a laboratory test, using controls, standards and blanks, to ensure that test procedure and reagents are up to standards.

4. Record temperature of storage units or testing apparatus, using thermometer or thermostat readings and designated QC record book(s), to maintain records of temperature variations.

5. Investigate temperature or test variations, using problem-solving technique and laboratory guidelines, to ensure that temperature/test variations will not interfere with test results.

6. Wash laboratory equipment, glassware and instruments, using appropriate cleaning materials and techniques, to maintain supply of clean glassware.

7. Sterilize laboratory equipment, glassware and instruments, using autoclaves, hot air ovens or disinfectants, to decontaminate soiled materials.

8. Record performance of maintenance or quality control procedures, using record books, to assure appropriate function and maintenance of equipment.

9. Inventory supplies and equipment, using proper inventory forms, to determine supply levels.

F. PROVIDING CARE AND MAINTENANCE OF EQUIPMENT AND SUPPLIES (continued)

10. Prepare requisitions, using required forms, to replenish supplies and equipment.

G. PREPARING SPECIMENS FOR ANALYSIS

1. Evaluate specimens, using knowledge of test requirements, to ensure specimen is properly prepared for required analysis.

2. Sort specimens, using knowledge of test requirements, to determine order of priority and plan of work.

3. Report unusual or special conditions of the specimen, using knowledge of normal conditions, to provide proper treatment of the specimen.

4. Label specimen(s) and tube(s), using laboratory identification system, to assure correct reporting of test results.

5. Heat tubes or test samples, using heat blocks, to permit test reactions to occur at designated temperature(s).

6. Separate specimen(s), using centrifuge and appropriate laboratory supplies, to prepare specimen for analysis.

7. Prepare a specimen, using approved containers and sealing supplies, to ship specimen(s) to other facilities for testing.

8. Affix clinical specimens onto clean glass slides, using appropriate techniques, to prepare smears for staining procedures.

H. PERFORMING HEMATOLOGIC PROCEDURES

1. Prepare sample(s), using appropriate stains, reagents and other equipment, to perform routine hematology tests (including blood counts, sickle cell tests, hemoglobin, hematocrit, platelet counts, reticulocyte count and differential(s).

2. Perform hemoglobin test, using cyanmethemoglobin method, to determine hemoglobin concentration.

3. Calculate WBC, using knowledge of dilution, to determine number of WBC/cmm.

4. Perform RBC, using appropriate equipment and dilent, to determine number of RBC/cmm.

5. Perform hematocrit (macro- and micro-), using appropriate supplies, to determine packed cells to total volume.

6. Perform routine hematology tests, using automated hematology equipment (including microscope, microhematocrit centrifute and reader, hemoglobinometer and automatic cell counters), to determine presence and amts of various blood components.

H. PERFORMING HEMATOLOGIC PROCEDURES (continued)

7. Prepare a smear for differential count, using appropriate slides and stains, to produce a smear for examination.

8. Examine blood smear using knowledge of morphology, stain and microscopy to differentiate WBCs and RBCs.

9. Perform a hemoglobin test, using hemolysis sticks and hemoglobinometer, to determine hemoglobin concentration.

10. Calculate erythrocyte indices, using knowledge of related parts of red blood count, to determine hemoglobin/cell concentration.

11. Perform routine coagulation procedures, using appropriate reagents and equipment, to determine the patients clotting mechanisms.

12. Perform bleeding time, using knowledge of normal limits and adverse reactions, to determine deficiency or adequacy of coagulation factors.

13. Perform clot retraction, using appropriate supplies and timers, to determine platelet function.

14. Perform erythrocyte sedimentation rate (Wintrobe or Westergren), using appropriate equipment and timers, to determine rate of settling.

15. Perform reticulocyte count, using appropriate reagents and supplies, to determine adequacy of red blood cell production.

16. Perform spinal fluid cell count, using knowledge of handling, diluting and staining, to obtain results for treatment and/or diagnosis.

17. Perform a direct platelet count, using diluents and a microscope, to determine number of thrombocytes/cmm of blood.

I. PERFORMING URINALYSIS

1. Observe color and appearance of urine specimen, using knowledge of their normal and abnormal characteristics, to determine the physical properties of the specimen.

2. Perform dipstick analysis, using appropriate reagents, to determine chemical content of a urine specimen.

3. Evaluate urinary sediment, using light microscope, to determine cellular or crystalline constituents present in a urine specimen.

J. PERFORMING CHEMISTRY ANALYSIS

1. Process a specimen, using heating, agitating, filtering or titrating operations, to prepare a sample for additional testing.

2. Prepare a blood sample and body fluid for electrophoresis determination, using instruments, glassware and reagents, to determine levels of various biochemical constituents.

J. PERFORMING CHEMISTRY ANALYSIS (continued)

3. Analyze blood or body fluid sample(s), using flame photometer, to determine presence and amounts of biochemical constituents.

4. Analyze blood or urine specimen, using chloridometer, to estimate amount of chlorides in sample.

5. Prepare protein free filtrate, using knowledge of speciment requirements, to obtain working sample for testing purposes.

6. Analyze blood or body fluids, using a spectrophotometer, glassware and reagents, to determine amounts of glucose,

7. Analyze blood or body fluids, using spectrophotometer, glassware, and reagents, to determine amount of cholesterol.

8. Perform glucose tolerance test, using knowledge of time test materials and specimen requirements, to obtain results for treatment and/or diagnosis.

9. Perform bilirubin test (direct and indirect), using a knowledge of reactants, to obtain results for treatment and/or diagnosis.

10. Analyze blood or body fluids, using spectrophometer, glassware, and reagents, to determine amounts of urea.

11. Measure blood or body fluids, using pH meter, to determine level of acidity or alkalinity in sample.

12. Perform calcium test (titration), using knowledge of reagents, to obtain results for treatment and/or diagnosis.

13. Perform chlorides test, using knowledge of reagents, to obtain results for treatment and/or diagnosis.

14. Perform amylase test, using knowledge or reagents, to obtain results for treatment and/or diagnosis.

15. Analyze blood samples, using blood gas apparatus, to determine amount of CO_2 and pH in blood.

16. Analyze blood of body fluids, using radioisotope measurement instruments such as scanner, scintillation camera, liquid scintillation system and cell counting equipment, to detect presence of isotopes injected or ingested.

K. PERFORMING MICROBIOLOGY PROCEDURES

1. Prepare sterile media, using standard microbiological media and supplies, to provide nutrients for bacteriological culturing.

K. PERFORMING MICROBIOLOGY PROCEDURES

2. Store sterile media, using controlled temperature refrigerator, to assure optimal conditions of the culture media.

3. Inoculate culture media, using appropriate media, specimen and inoculation instrument, to provide nutrients for growth of micro-organisms.

4. Incubate inoculated media or designated specimen, using controlled incubator conditions (aerobic/anaerobic), to provide optimal conditions for growth of microorganisms.

5. Examine inoculated culture media or designated specimens, using knowledge of bacterial growth patterns, to determine presence of significant growth.

6. Initiate subcultures, using subculture media and techniques, to identify significant microorganisms.

7. Perform mycological or parasitological evaluation, using designated reagents and equipment, to examine specimen for fungi or parasites.

8. Evaluate viral cultures, using knowledge of viral growth, to determine presence and nature of virus in clinical specimen.

9. Perform antibiotic sensitivity test, using resources and discs, to determine antibiotic choices for treatment.

10. Discard contaminated media and specimens, using approved containers and techniques, to maintain an environment free of contamination.

11. Maintain stock cultures, using appropriate media, to ensure positive controls for required quality control.

12. Prepare slides by Gram stain method, using appropriate reagents, to obtain fixed materials.

13. Stain slides by AFB method, using appropriate stains, to obtain fixed material.

14. Stain smears, using authorized reagents and stains, to prepare slides for microscopic evaluation (general).

15. Examine stained slides (smears), using light microscope, to determine presence, nature, and extent of cellular damage.

16. Stain slides by India Ink method, using appropriate reagents, to obtain fixed material.

17. Prepare parasitological "wet prep" slides, using knowledge of aseptic technique and appropriate materials, to obtain usable preparation.

18. Process specimens for inoculation of T.B. organisms, using knowledge of growth requirements to obtain optimal growth.

L. PERFORMING SEROLOGIC PROCEDURES

1. Prepare samples of blood or body fluids, using reagents and glassware, to process these materials for further examination.

2. Examine prepared slides of blood or body fluids, using fluorescent microscope, to detect presence of antibodies or organisms in samples.

3. Perform blood samples, using glassware, reagents and ASO, heterophile RA and similar tests, to detect specific antibodies.

4. Perform VDRL, RPR or other similar tests, using specified reagents, glassware and equipment, to detect the presence of serum factors indicating venereal disease.

5. Perform blood or urine samples, using specified glassware, reagents and other instruments, to detect antibodies which appear in pregnant females.

6. Perform semen analysis, using knowledge of collection, counting, and microscopic characteristics, to determine count and character of sperms.

M. PERFORMING BLOOD BANK PROCEDURES

1. Store blood products, using temperature-controlled refrigerator, to protect specimens for use in transfusions.

2. Prepare blood products, using refrigerated centrifuge, to provide products for transfusion.

3. Prepare blood products, using refrigerated centrifuge, to provide leukocytes and packelcells (erythrocytes) and plasma for transfusion.

4. Freeze red cells, using approved procedures and containers, to preserve cells for transfusion.

5. Inspect units of blood, using expiration data and knowledge of the physical characteristics of units of blood, to insure that expiration dates have not passed and that units appear normal.

6. Group or type blood samples, using typing sera, to classify blood according to blood group and Rh factor.

7. Perform cross-match test, using typing sera and cells, blood specimens and appropriate equipment, to determine compatability of blood between patient and donor.

8. Dispose of used blood containers and pilot tubes, using expiration date and knowledge of aseptic technique, to get rid of contamined material.

9. Perform first aid for shock, using knowledge of adverse reactions, to revive patient.

10. Complete interview and basic testing of donor, using a knowledge of normal limits, to determine suitability of donor.

M. PERFORMING BLOOD BANK PROCEDURES (continued)

11. Take blood pressure and/or pulse rate of donor, using a knowledge of normal limits, to determine suitability of donor.

N. PERFORMING CLERICAL DUTIES

1. Log specimens, using recommended forms, ledger, and specimens, to identify patient and specimen type received for testing.

2. Post test results, using laboratory report forms, to prepare lab reports for a patient chart.

3. Record statistical data, using a typewriter, specified forms and patient test data, to maintain records.

4. Label slides and other clinical materials, using specified system, to prepare them for temporary or permanent storage.

5. Store clinical materials, using approved storage areas and containers, to preserve clinical material for future references.

6. File records of laboratory tests, using laboratory report slips and specified filing equipment, to ensure availability and ready access to test results.

O. USING EMPLOYABILITY SKILLS

1. Perform a self-assessment, using knowledge and information, to compile a list of personal attributes.

2. Perform a self-assessment, using knowledge and information, to identify areas of work that will provide personal job satisfaction.

3. Perform a self-assessment, using knowledge and information, to determine methods to reduce levels of stress.

4. Compile an occupational profile, using reference materials, to determine the characteristics, requirements, and employment outlook of an occupation.

5. Investigate non-wage job characteristics, using available resources, to identify significant job factors.

6. Develop goals, using knowledge, to determine career objective(s).

7. Perform a job search, using information, to identify employment opportunities.

8. Participate in an information interview, using knowledge and resources, to obtain information about a job from an employer.

9. Complete a social security form, using information, to apply for a social security number.

O. USING EMPLOYABILITY SKILLS (continued)

10. Contact an employer, using a telephone, to pursue potential employment opportunities.

11. Complete a job application, using personal notes, to apply for employment.

12. Prepare a resume, using personal information, to apply for a job.

13. Write a letter, using personal notes, to apply for a position.

14. Demonstrate appropriate dress, using a knowledge of job requirements, to comply with standards of on-the-job attire and grooming.

15. Interview for a job, using communication skills, to secure employment.

16. Contact a job interviewer, using a telephone, to accept/reject a job.

17. Complete forms, using information, to withhold city, state, and federal taxes.

18. Describe performance evaluation measurements, using knowledge, to identify behavior/attitudes that employers expect employees to exhibit on-the-job.

19. Perform a continuing education program search, using available resources, to identify opportunities for retraining, skills upgrading, and career advancement.

20. Analyze career information, using available resources, to identify the opportunities for advancement that exist within an occupation.

21. Describe job resignation/dismissal practice, using knowledge, to identify positive methods for terminating an employment situation.

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 1

Task: Select safety supplies, using knowledge of laboratory task, to ensure personal protection.

Achievement Indicators: The learner:	Yes	No
1. Read laboratory safety procedures and precautions related to personal protection -	____	____
2. Demonstrated the use of the following laboratory safety supplies:		
a. Lab coat - for protection of clothing -	____	____
b. Safety eye goggles/glasses - for protection against splashes -	____	____
c. Rubber apron - for protection against acids/bases -	____	____
d. Surgical gloves - for protection against contamination -	____	____
e. Metal tongs, "hot hand", asbestos gloves, folded cloth towel - for protection against hot objects -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to departmental safety policies.

Tools and Equipment:	**Resources:**
Safety eye wash, shower goggles, rubber apron, surgical or protective gloves, metal tongs, fume hoods, fire extinguisher, flame proof storage cabinet	Bibliography: 6, 10, 14, 21

Teacher Activities	Student Learning Activities
1. How, what, why this exercise? 2. Safety as part of lab assisting. Is it necessary? Why? 3. Validity of safety as vital part of this course. 4. Negative presentation: What happens if you don't. . . Use poster in this series. "Mary never liked to wear protective goggles, now she doesn't have to." Films from OSHA on lab safety and personal safety. (these vary) 5. Speaker from OSHA, fire department. 6. Set up practice drills on evaluating in case chemicals are broken, or fire. 7. How to use shower/eye wash. 8. How to use goggles, aprons, protective pipettes. 9. Practice cleaning spills. 10. Practice transporting caustic materials. Evaluate students using various pieces of safety equipment. Written and practical assessment on personal safety.	1. Read assignments relating to laboratory safety and personal safety in the laboratory. 2. Examine and make a note of where safety equipment is located in the room. 3. Locate and practice using escape routes from classroom and from building in event of emergency. 4. Study the laboratory safety: a. Charts in the lab. b. Study the "first aid" charts. c. Locate the "first aid" kit, fire blanket, fire extinguisher, emergency shower and eye wash. 5. Make notes of emergency signals if applicable. 6. Write for information from OSHA. 7. Write a paper on why personal safety is important and simple steps that can be taken in the lab/classroom to prevent accidents. 8. Pass written assessment and pass practical assessment.

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 2

Task: Operate safety equipment, using knowledge of safety procedures, to provide personal/environmental protection.

Achievement Indicators: The learner:	Yes	No
1. Read laboratory safety procedures on the correct use of laboratory safety equipment -	____	____
2. Demonstrated the use of the following laboratory safety equipment:		
a. Fume hood - for use with hazardous reagents -	____	____
b. Safety eyewash - for use in eye related accidents -	____	____
c. Safety shower - for use in caustic burns -	____	____
d. Fire extinguisher - for use in room fires -	____	____
e. Fire blanket - for use in personnel fires -	____	____
f. Flame proof storage cabinet - for storage of flammable reagents -	____	____
g. Explosion proof refrigerator - for storage of explosive reagents -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to departmental safety policies.

Tools and Equipment:	**Resources:**
As A-1, explosion proof refrigerator	Bibliography: 6, 10, 14, 21

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 3

Task: Employ precautions, using knowledge of safety procedures, to handle hazardous reagents.

Achievement Indicators: The learner:	Yes	No
1. Identified various types of hazardous reagents -	____	____
2. Wore safety eye goggles/glasses -	____	____
3. Wore rubber apron when handling acids/bases -	____	____
4. Used fume hood when working with hazardous reagents -	____	____
5. Kept flammable reagents away from open flame -	____	____
6. Cleaned up acid/base spills -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to departmental safety policies.

Tools and Equipment:	**Resources:**
As A-1 and A-2	Bibliography: 6, 10, 14, 21

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 4

Task: Employ precautions, using knowledge of safety procedures, to handle hot materials.

Achievement Indicators: The learner:	Yes	No
1. Identified the correct procedure when handling hot materials -	____	____
2. Demonstrated the correct use of the hot plate -	____	____
3. Demonstrated the safe use of the gas burner -	____	____
4. Handled hot glassware using the following equipment:		
a. Metal tongs -	____	____
b. "Hot Hand" -	____	____
c. Asbestos gloves -	____	____
d. Folded cloth towel -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure manual and/or departmental safety policies.

Tools and Equipment:

Tongs, hot plate, asbestos gloves, Bunsen or Fisher burner, "Hot Hand" cloth towel

Resources:

Bibliography: 6, 10, 14, 21

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 5

Task: Employ precautions, using knowledge of safety procedures, to handle sharp objects.

Achievement Indicators: The learner:	Yes	No
1. Attached scalpel blade/razor blade to handle in a safe manner -	____	____
a. Open and attach sterile needle or lancet -	____	____
2. Removed scalpel blade/razor blade from handle in a safe manner -	____	____
a. Remove needle from syringe or holder -	____	____
3. Disposed scalpel blade/razor blade in designated receptacle -	____	____
a. Disposed of needle or lancet in designated receptacle -	____	____
4. Transported microtome knife in its box to work area -	____	____
a. Disposed of used needle in designated container -	____	____
5. Handled microtome knife with care -	____	____
6. Cleaned microtome knife wiping toward knife edge -	____	____
7. Used knife guard on microtome knife when sectioning -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory procedure manual or departmental safety policy.

Tools and Equipment:	**Resources:**
Scalpel blades, razor blades, handles, microtome knife, knife guard, biohazard receptacle destro clip	Bibliography: 6, 10, 14, 21

Duty: Employing Laboratory Safety Procedures	**Duty No.** A
	Task No. 6

Task: Employ precautions, using knowledge of safety procedures, to prevent contamination.

Achievement Indicators: The learner:	Yes	No
1. Read instructions on the correct procedure to handle bio-hazard materials -	____	____
2. Identified potential bio-hazards -	____	____
3. Wore protective clothing -	____	____
4. Handled potential bio-hazards with surgical gloves -	____	____
5. Employed extended fixation time on suspected bio-hazardous specimens -	____	____
6. Disposed contaminated linens in labeled bio-hazard bag -	____	____
7. Autoclaved contaminated glassware -	____	____
8. Disinfected contaminated laboratory countertops and equipment -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory procedure manual or departmental safety policy.

Tools and Equipment:	**Resources:**
Instruction manual, protective clothing, surgical gloves, bio-hazard bags, autoclave, disinfectant	Bibliography: 6, 10, 14, 21

Duty: Communicating with Employees and Patients	**Duty No.** B
	Task No. 1

Task: Introduce self, using a knowledge of verbal and nonverbal communication, to interact with a patient.

Achievement Indicators: The learner:	Yes	No
1. Approached patient upon entering room -	____	____
2. Spoke to the patient in a clear distinct voice -	____	____
3. Identified self by name and purpose -	____	____
4. Asked patient to state his/her name; checked the identification bracelet of infants or adults who cannot identify themselves -	____	____
5. Checked laboratory order to assure that the lab order was the same as that given by the patient -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Teacher Activities	Student Learning Activities
1. Involved students in a question/answer session about communication. 2. Discussed importance of communicating effectively with employers, employees, patients. 3. Introduced students to communication theory; showed communication film; gave quiz. 4. Paired off students and assigned them to role playing situations. 5. Summarized main points of verbal - nonverbal communication.	1. Participated in question/answer session. 2. Listened to overview. 3. Listened to lecture, watched film and took quiz. 4. Practiced task. Role played - employer, employee and/or patient. 5. Took notes on summary.

Duty: Communicating with Employers and Patients	**Duty No.** B
	Task No. 2

Task: Take messages, using an intercom, to communicate information.

Achievement Indicators: The learner:	Yes	No
1. Answered intercom promptly and courteously -	____	____
2. Identified self and location -	____	____
3. Repeated message -	____	____
4. Replied distinctly and in a polite manner -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Duty: Communicating with Employers and Patients	**Duty No.** B
	Task No. 3

Task: Place a call using a telephone and a knowledge of standard business telephone manners to communicate information.

Achievement Indicators: The learner:	Yes	No
1. Reviewed the use of a telephone with a supervisor -	____	____
2. Assured telephone number(s) to be called was (were) written and in a direct view -	____	____
3. Assembled equipment necessary to write notes	____	____
4. Manipulated buttons and/or dials on the telephone -	____	____
5. Positioned mouthpiece of telephone to assure audibility of voice -	____	____
6. Spoke to other party in prescribed manner -	____	____
7. Wrote any needed messages -	____	____
8. Replaced receiver gently -	____	____
9. Recorded/reported information from call per institutional policy -	____	____

Criteria: Competence in the task will be recognized when the achievement indictors are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Duty: Communicating with Employers and Patients	**Duty No.** B
	Task No. 4

Task: Answer a telephone using a knowledge of standard business telephone manners to communicate information.

Achievement Indicators: The learner:	Yes	No
1. Reviewed the use of a telephone with a supervisor -	____	____
2. Assembled equipment necessary to write notes -	____	____
3. Manipulated receiver to assure audibility of voice -	____	____
4. Spoke into telephone in prescribed manner -	____	____
5. Wrote any needed messages -	____	____
6. Replaced receiver gently -	____	____
7. Recorded/reported information from call per institutional policy -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Duty: Communicating with Employers and Patients	**Duty No.** B
	Task No. 5

Task: Demonstrate verbal/non-verbal communication skills, using knowledge, to interact with a patient.

Achievement Indicators: The learner:	Yes	No
1. Demonstrated through verbal and written messages that good communication between student and patient is helpful in building a good relationship -	____	____
2. Demonstrated that communication is more than words by using appropriate gestures, facial expressions, and body movements -	____	____
3. Used friendly approach to patient without volunteering personal information -	____	____
4. Demonstrated during interactions with patient that feelings and thoughts are always being exchanged -	____	____
5. Demonstrated during interactions with patient that student is interested in what patient, visitors and staff members say -	____	____
6. Maintained ethical behavior by not discussing patient situations for reasons other than patient care -	____	____
7. Spoke clearly and slowly and in a pleasant tone -	____	____
8. Used normal vocabulary in conversations with patients and visitors, avoided medical terms or abbreviations -	____	____
9. Showed respect of patient's moods by keeping silent and avoiding constant talking -	____	____
10. Avoided whispering or mumbling in patient's presence -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Duty: Communicating with Employers and Patients	**Duty No.** B
	Task No. 6

Task: Demonstrate professional conduct, using knowledge, to maintain successful employment relationships.

Achievement Indicators: The learner:	Yes	No
1. Quality of work:		
a. Was accurate when reporting, recording and filing laboratory information and/or reports -	____	____
b. Had legible penmanship -	____	____
c. Displayed proper skills when collecting laboratory samples -	____	____
d. Organized working time effectively so that he/she carried out tasks and on time -	____	____
2. Dependability:		
a. Reported to work at the proper time - was seldom if ever late -	____	____
b. Followed the attendance policies of the institution -	____	____
3. Personal Qualities:		
a. Dressed appropriately - uniform, shoes, hair, and fingernails were neat and clean -	____	____
b. Exhibited high standards of personal hygiene -	____	____
c. Showed evidence of physical vitality and enthusiasm for the job -	____	____
4. Attitude:		
a. Revealed a genuine interest in the work -	____	____
b. Had the ability to accept and act on constructive criticism -	____	____
c. Demonstrated the ability for self-evaluation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the policy of the institution.

Tools and Equipment:	**Resources:**

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 1

Task: Select laboratory glassware, using knowledge of function to perform laboratory procedures.

Achievement Indicators: The learner:	Yes	No
1. Identified various pieces of glassware according to:		
a. Name -	____	____
b. Capacity -	____	____
c. Heat resistance -	____	____
d. Function -	____	____
2. Described glassware according to:		
a. Markings -	____	____
b. Abbreviations -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures of institution.

Tools and Equipment:	**Resources:**
Glassware, assorted sizes, shapes, and functions	Bibliography: 27, 28

Teacher Activities	Student Learning Activities
Review 1. Name various types of special glassware used in your home. 2. Do you use special dishes, (of glass) corningware to cook? 3. Do you use special glassware for special occasions? Why? Examples of special use glassware, cookware. Overview What/why use special glassware? Why is shape important? Presentation Show various kinds of glassware. Display as many pieces of laboratory glassware as possible. Exercise Have students examine glassware. Draw pictures of glassware, have students identify and describe function. Summary Crossword puzzles in forms of different pieces. Pen/paper assessment Word games allowing students to give names, functions of glassware.	1. Read pages 11-28 MLS. 2. Do Lab-Lesson 1, LTHS. 3. Examine glassware on display. 4. Work crossword puzzles and answer questions of names, functions of glassware. 5. Pass a practical quiz where glassware is displayed without names, at least 85% correct. Name and function for glassware on display.

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 2

Task: Perform basic calculation(s), using knowledge of laboratory mathematics, to determine quantities required for test performance.

Achievement Indicators: The learner:	Yes	No
1. Identified three units of metric measurement and commonly used prefixes -	____	____
2. Explained the conversion factors within the metric system -	____	____
3. Calculated the quantities required for the following solutions:		
a. Liquid/liquid percent solution -	____	____
b. Liquid/solid percent solution -	____	____
c. Normal solution -	____	____
d. Molar solution -	____	____
4. Calculated the ratio for increasing/decreasing total volume of solutions -	____	____
5. Calculated the ratio required for diluting solutions -	____	____

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Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to a laboratory mathematic manual.

Tools and Equipment:	**Resources:**
Slide rule, calculator or computer	Bibliography: 5, 7, 20

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 3

Task: Weigh out chemicals using laboratory balances and supplies to prepare solutions.

Achievement Indicators: The learner:	Yes	No
1. Chose appropriate weighing instrument:		
a. Triple beam balance -	____	____
b. Double Pan balance -	____	____
c. Digital balance -	____	____
2. Placed balance on level surface and used tare adjustment knob if needed -	____	____
3. Used weigh boat -	____	____
4. Read label accurately to ensure correct selection of liquid reagent -	____	____
5. Used distilled/deionized water for aqueous solutions -	____	____
6. Demonstrated the correct method of transferring a dry reagent from the container to the balance -	____	____
7. Completed weighing chemical reagent, obtaining accurate measurement -	____	____
8. Cleaned balance, resetting scale to zero -	____	____
9. Cleaned work area and returned supplies and equipment to cabinets or storage area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the supervisor and standard laboratory policy.

Tools and Equipment:

Balances, scoopulas, spatulas, weighing paper, volumetric flasks, pipettes, distilled water, reagents

Resources:

Bibliography: 5, 7, 22, 28

Duty: Using Basic Laboratory Skills | **Duty No.** C | **Task No.** 4

Task: Measure volume of clinical material or laboratory solutions using appropriate laboratory containers, to prepare solutions or specimens for laboratory tests.

Achievement Indicators: The learner:	Yes	No
1. Selected glassware appropriate for test or preparation -	____	____
2. Used pipetting device if pipet used -	____	____
3. Measured liquid using appropriate size graduate cylinder, if cylinder used -	____	____
4. Read liquid level at meniscus -	____	____
5. If preparing solution, or reagent, used volumetric glassware -	____	____
6. Demonstrated correct technique used in pouring from one container to another -	____	____
7. Cleaned work area and returned supplies and equipment to appropriate storage areas -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructions in lab manual.

Tools and Equipment:

Assorted glassware (graduate and volumetric), pipetting devices, dist. H_2O, alconox

Resources:

Bibliography: 9, 21, 27

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 5

Task: Measure length or area using appropriate measuring device to provide size or dimension information required for laboratory work.

Achievement Indicators: The learner:	Yes	No
1. Indicated knowledge of linear units of metric system -	____	____
2. Read and recorded ± 1mm the known length of an object -	____	____
3. Read and recorded ± 1 mm the known width of an object -	____	____
4. Read and recorded ± 1 mm the known height of an object -	____	____
5. Used information from 2 and 3 to calculate area of an object -	____	____
6. Used information from 2, 3 and 4 to calculate volume of an object -	____	____
7. Prepare specimen according to size specifications -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructor - supervisor or standard laboratory policy.

Tools and Equipment:	**Resources:**
Metric rulers or meter sticks	Bibliography Mathematics for Health Occupations

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 6

Task: Mix chemical(s) using standard laboratory equipment and chemicals to prepare reagents, solutions or stains.

Achievement Indicators: The learner:	Yes	No
1. Selected chemical of appropriate grade or purity (commercial, CP, AR or USP) -	____	____
2. Employed distilled water for dilutions -	____	____
3. Chose mixing vessels according to type of solution desired:		
a. Graduate cylinder for percent solution -	____	____
b. Volumetric glassware for normal or molar solution	____	____
4. Observed special handling procedures for chemicals by:		
a. Employing fume hood for handling concentrated acids and bases, flammable or volatile materials -	____	____
b. Adding acid to water -	____	____
c. Disposing of glassware which contains chemical residue in a manner which will not constitute a hazard to personnel -	____	____
5. Used personal safety equipment as necessary:		
a. Apron -	____	____
b. Protective gloves -	____	____
c. Goggles -	____	____
d. Safety carriers -	____	____
e. Manual (non-mouth) and automatic dispensing devices -	____	____
6. Labeled reagent, solution or stain bottle appropriately for storage:		
a. Contents and concentration -	____	____
b. Procedure in which employed -	____	____
c. Date of manufacture or expiration -	____	____

	Yes	No
d. Precautions for use or disposal -	____	____
e. Temperature of storage -	____	____
f. Initials of preparer -	____	____
7. Cleaned work area and returned supplies/equipment to appropriate storage area -	____	____
8. Stored prepared solution in proper place to maintain shelf life -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner which is consistent with written guidelines and employer standard safety policy.

Tools and Equipment:

Volumetric and graduated glassware, weighing boats and/or paper, spatulas, weights, balances, safety glasses, protective gear, pipetting devices, labels, lab pens

Resources:

Bibliography: 9, 21, 26, 28

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 7

Task: Store prepared solution(s) and stains using knowledge of their properties to maintain them in optimal condition.

Achievement Indicators: The learner:	Yes	No
1. Chose appropriate storage containers by:		
a. Storing alkali in plastic bottles -	____	____
b. Never employing volumetric glassware for storage -	____	____
c. Using brown bottles to contain light-sensitive solutions -	____	____
d. Placing flammable substances (e.g., alcohols, and ethers) in a safety can -	____	____
2. Arranged for appropriate storage place by:		
a. Providing safety cabinets and floor level shelves for strong acids and bases -	____	____
b. Permitting a limited amount (less than 500 ml) of hazardous material to be stored at the bench -	____	____
c. Providing separate storage for acids and alkalies, for oxidizing and reducing agents -	____	____
3. Maintained temperature requirements (e.g., refrigerator, freezer) to prevent evaporation or deterioration of solutions or stains -	____	____
4. Transferred hazardous solutions from site of storage to site of use in plastic safety carriers -	____	____
5. Observed expiration date(s) of stored solutions by:		
a. Using oldest solution first -	____	____
b. Removing expired solutions from storage -	____	____
c. Appropriately disposing of solutions -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with manufacturer's instruction or written laboratory guidelines.

Tools and Equipment:

Safety cabinet, polyethylene bottles, brown bottles, safety cans, refrigerator with freezer, safety carriers, bio-hazard disposal cannister

Resources:

Bibliography: 2, 3, 5, 12, 14, 17, 18, 22, 25, 27

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 8

Task: Use commercial pH indicator paper to determine the acidic/basic levels of a solution.

Achievement Indicators: The learner:	Yes	No
1. Read instructions on the correct use of commercial pH indicator paper -	____	____
2. Removed approximately one inch paper strips from container -	____	____
3. Placed strips in specified solutions -	____	____
4. Compared color on test strips with color chart -	____	____
5. Recorded pH measurement as indicated on color chart -	____	____
6. Cleaned up work area and returned supplies/equipment to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to manufacturer's instructions and lab manual.

Tools and Equipment:	**Resources:**
Red/blue litmus paper	Bibliography: 28
Nitrazine paper	
Hydrion paper	

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 9

Task: Operate a pH meter, using appropriate equipment, to determine the acidic/basic level of a solution.

Achievement Indicators: The learner:	Yes	No
1. Reviewed instructions from operator's manual -	____	____
2. Plugged in pH meter, allowing for warm-up period -	____	____
3. Set temperature dial at room temperature -	____	____
4. Checked electrode for correct level of filling solution -	____	____
5. Rinsed electrode in distilled water - blotted dry -	____	____
6. Placed electrode in standard buffer solution -	____	____
7. Standardized pH meter -	____	____
8. Rinsed electrode in distilled water - blotted dry -	____	____
9. Placed electrode in solution to be tested -	____	____
10. Read and recorded pH measurement -	____	____
11. Rinsed electrode in distilled water - blotted dry -	____	____
12. Stored electrode according to manufacturer's directions -	____	____
13. Cleaned up work area and returned supplies/equipment to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to operator's manual.

Tools and Equipment:

pH meter, reference material, distilled water, absorbent paper towels, operator's manual

Resources:

Bibliography: 21

Operator's manual for specific pH meters

Filmstrip "Use of pH Meters", Prentis Hall

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 10

Task: Measure length, using a metric ruler, to obtain size or dimension information.

Achievement Indicators:	The learner:	Yes	No
1.	Demonstrated knowledge of metric units using a metric ruler -	____	____
2.	Measured various specified lengths using a metric ruler -	____	____
3.	Trimmed tissue specimens to recommended dimensions of 10mm x 15mm x 3mm -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructional guides.

Tools and Equipment:	**Resources:**
Metric ruler, test material	Bibliography: 28, 29

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 11

Task: Measure temperature, using a laboratory thermometer, to determine degree of heat.

Achievement Indicators: The learner:	Yes	No
1. Demonstrated knowledge of Celsius/Farenheit temperature scales -	____	____
2. Converted specified Farenheit temperatures to Celsius -	____	____
3. Identified various types of laboratory thermometers -	____	____
4. Demonstrated correct care and use of laboratory thermometer -	____	____
5. Measured temperature of specified items -	____	____
6. Cleaned up work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructor's specifications.

Tools and Equipment:

$^{o}C/^{o}F$ thermometers
^{o}F thermometer
Outdoor thermometer
Candy/meat thermometer

Resources:

Filmstrip: Use of Thermometers - Prentice Hall
Bibliography: 28

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 12

Task: Check alcohol reagents, using an alcohol hydrometer, to determine percentage of solution.

Achievement Indicators: The learner:	Yes	No
1. Demonstrated knowledge of purpose of alcohol hydrometer -	____	____
2. Selected Traille scale to determine percentage of alcohol concentration -	____	____
3. Measured alcohol concentration on specified samples -	____	____
4. Cleaned up work area and returned supplies/equipment to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to written instructional guidelines.

Tools and Equipment:	**Resources:**
Alcohol hydrometers	Bibliography: 27, 28 Filmstrip: Use of Hydrometers - Prentice Hall

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 19

Task: Use a compound microscope, using knowledge of resolution, to examine specimen slides.

Achievement Indicators: The learner:	Yes	No
1. Read instructions on operator's manual -	____	____
2. Used correct procedure for transporting microscope -	____	____
3. Plugged in microscope to electric outlet -	____	____
4. Rotated low power objective into working position -	____	____
5. Placed slide on (mechanical) stage -	____	____
6. Adjusted oculars -	____	____
7. Focused slide using coarse adjustment -	____	____
8. Focused slide using fine adjustment -	____	____
9. Focused slide using left ocular -	____	____
10. Adjusted diaphram as needed -	____	____
11. Adjusted condenser lens as needed -	____	____
12. Adjusted centering screws on sub-stage as needed -	____	____
13. Observed slide using medium and high power objectives -	____	____
14. Returned low power objective into working position -	____	____
15. Lowered stage and turned off light source -	____	____
16. Removed slide from stage -	____	____
17. Covered microscope with protective case -	____	____
18. Cleaned up work area and returned supplies/equipment to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to owner's manual specific to given microscope.

Tools and Equipment:

Compound microscope $\overline{c}$
10x, 40x, 100x objectives
Prepared slides

Resources:

Bibliography: 26, 27, 28
Film: Compound Microscope - Bausch-Lomb

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 14

Task: Focus with oil immersion lens, using knowledge of refraction, to obtain maximum magnification.

Achievement Indicators: The learner:	Yes	No
1. Read instruction manual -	____	____
2. Used accepted technique to focus on LOW POWER:		
a. Focused using coarse adjustment -	____	____
b. Focused using fine adjustment -	____	____
c. Adjusted light by using diaphragm and condenser lens -	____	____
d. Sharply focused object using fine adjustment -	____	____
3. Placed small drop of immersion oil on slide -	____	____
4. Rotated oil immersion lens into position -	____	____
5. Sharply focused object using fine adjustment -	____	____
6. Observed several fields for maximum view -	____	____
7. Made necessary observations -	____	____
8. Returned objective to low power -	____	____
9. Lowered stage/raised objective -	____	____
10. Removed slide from stage -	____	____
11. Turned off light source and/or slide and stage -	____	____
12. Cleaned oil from oil immersion lens -	____	____
13. Replaced microscope cover -	____	____
14. Cleaned up work area -	____	____
15. Returned prepared slides to slide file -	____	____
a. Cleaned oil from slide before filing -	____	____
16. Returned equipment to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to operator's manual.

Tools and Equipment:	**Resources:**
Compound microscopes with oil immersion lens, immersion oil, prepared slides, xylene (lens cleaner)	Bibliography: Owner's Manual 8, 16, 21, 27, 28

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 15

Task: Clean laboratory glassware, using appropriate cleaning materials and techniques, to ensure reliable results.

Achievement Indicators: The learner:	Yes	No
1. Read instructions on the correct procedure to chemically clean laboratory glassware -	____	____
a. Followed safety procedures -	____	____
2. Chose appropriate detergent and supplies -	____	____
3. Rinsed laboratory glassware -	____	____
4. Washed laboratory glassware in detergent solution using appropriate brush -	____	____
5. Rinsed laboratory glassware with hot tap water -	____	____
6. Rinsed laboratory glassware with distilled water -	____	____
7. Rinsed laboratory glassware with chemical solution if appropriate -	____	____
8. Rinsed laboratory glassware thoroughly if using chemical solution -	____	____
9. Placed laboratory glassware on rack to dry -	____	____
10. Returned laboratory glassware to their storage cabinet -	____	____
11. Cleaned up sink and countertops -	____	____
12. Following 4th tap water rinse, rinsed twice in distilled water -	____	____
13. Drained glassware on drying rack -	____	____
14. Placed small items, inverted on paper towel in beaker, in drying oven -	____	____
15. Placed dry glassware in appropriate storage place -	____	____
16. Cleaned and dried work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard operating procedure manual.

Tools and Equipment:

Drying racks, test tube brushes, beaker brushes, styluses, Alconox, 1% HCl, Potassium Dichromite, pipette washers, dishpans or dishwasher, gloves, protective clothing, goggles, distilled water

Resources:

Bibliography: 27, 28

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 16

Task: Separate substances by filtration using knowledge of porosity and acid/base reactions to obtain residue filtrate.

Achievement Indicators: The learner:	Yes	No
1. Identified cloudy or turbid preparation -	____	____
2. Selected appropriate filter paper:		
a. Size -	____	____
b. Porosity -	____	____
3. Folded filter paper for filtration purposes -	____	____
4. Set up filtration system initiated by gravity -	____	____
5. Set up system that required vacuum source for separation -	____	____
6. Collected residue or filtrate as specified for test -	____	____
7. Disposed of spent materials -	____	____
8. Cleaned work area -	____	____
9. Returned materials to appropriate storage area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to standard laboratory procedure.

Tools and Equipment:

Funnels, various size filter paper, suction apparatus, ring stands, clamps, flasks, beakers

Resources:

Bibliography: 21, 27

Duty: Using Basic Laboratory Skills	**Duty No.** C
	Task No. 17

Task: Titrate solutions using knowledge of acids and bases to obtain a precise pH.

Achievement Indicators: The learner:	Yes	No
1. Used a volumetric pipet to transfer the material being titrated into an Erlenmeyer flask -	____	____
2. Added the required amount of indicator -	____	____
3. Added the titrant from the buret to the solution in the flask -	____	____
4. Swirl the flask to mix with titrant drops -	____	____
5. Split drops as end point nears, a faint but lasting color -	____	____
6. Recorded the buret reading -	____	____
7. Repeated the process and averaged the two readings -	____	____
8. Rinse buret with tap water 5 times, or until clean -	____	____
9. Rinse buret with distilled or deionized water. Let dry -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to instructor guidelines.

Tools and Equipment:

Calibrated buret, standard solution, indicators, beakers, flasks, unknown samples, laboratory record book

Resources:

Bibliography: 21, 27
Film: Titration - Prentice Hall

Duty: Operating Laboratory Equipment	**Duty No.** D
	Task No. 1

Task: Operate Bunsen/Fisher burner, using safety precautions to obtain flame of maximum intensity.

Achievement Indicators: The learner:	Yes	No
1. Identified parts of Bunsen or Fisher burner -	____	____
2. Traced route of gas flow -	____	____
3. Described function of collar and air intakes -	____	____
4. Turned gas at valve -	____	____
5. Used striker or match to ignite -	____	____
6. Adjusted air intake to achieve proper flame -	____	____
7. Maintained flame for desired purpose -	____	____
8. Used standard safety precautions throughout procedure -	____	____
9. Shut off gas at valve -	____	____
10. Cleaned area and returned equipment to designated areas -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to standard operating procedure.

Tools and Equipment:	**Resources:**
Bunsen or Fisher burner, flame shield, goggles, striker or matches	Lab Techniques for High Schools - Barren

Teacher Activities	Student Learning Activities
Review 1. Present method for lighting burner, describe: a. Parts of burner b. Striker features 2. Compare parts of striker to cigarette lighter. Overview Why striker is better than match? Why use a burner/incinerator? Presentation 1. Light Bunsen, Fisher or alcohol flame. 2. Demonstrate how flame is controlled by using draft slots. Exercise 1. Have students follow flow of gas through burner. 2. Have students describe the parts and function of burners. Summary Pen/paper assessment. Prepare word games that allow students to trouble shoot problems with burners.	1. Read assignments covering use of the Bunsen, Fisher burner or alcohol lamp. Chapter/Lesson 20 "Laboratory Techniques for High School." 2. Perform the laboratory exercise. 3. Write answers to the "Questions for Review." 4. Pass a practical exercise, turn on burner 3 out of 4 times without difficulty.

Duty: Operating Laboratory Equipment	**Duty No.** D
	Task No. 2

Task: Calibrate burette using knowledge of temperature/volume relationship to prepare cure.

Achievement Indicators: The learner:	Yes	No
1. Volumetrically measured 5ml distilled with ± 0.05ml (ran multiples) -	____	____
2. Weighed water 5gm within ± 0.05gm -	____	____
3. Recorded temperature of water within ± 0.1°C -	____	____
4. Drew calibration graph -	____	____
5. Calculated percent error -	____	____
6. Cleaned work area -	____	____
7. Rinsed buret with tap water -	____	____
8. Rinsed buret with distilled or deionized water -	____	____
9. Returned equipment to appropriate storage area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to laboratory manual.

Tools and Equipment:

Volumetric glassware
Balances
Graph paper
Distilled H_2O

Resources:

Lab Techniques for High Schools - Barren

Duty: Operating Laboratory Equipment	**Duty No.** D
	Task No. 3

Task: Weigh with balances using knowledge of metrics to obtain results within 0.01g.

Achievement Indicators: The learner:	Yes	No
1. Handled balance and chemicals properly -	____	____
2. Wore protective/safety gear as required -	____	____
3. Cleaned balance pans -	____	____
4. Leveled balance and adjusted "zero" setting -	____	____
5. Set riders or added weights to right pan for desired weight -	____	____
6. Added carefully the desired substance until pointer "zeroed" or balanced -	____	____
7. Performed repetitive weighings to demonstrate skill -	____	____
8. Read and interpreted balance readings or amount of added weights -	____	____
9. Left balance pans clean and balance "at rest" -	____	____
10. Put away chemicals or weighing materials -	____	____
11. Returned balances to cabinet and cleaned work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to instruction manual or laboratory procedure.

Tools and Equipment:	**Resources:**
Balances, weights, weighing substances, scoopulas, weighing boats	Laboratory Techniques for High Schools - Barren

Duty: Operating Laboratory Equipment	**Duty No.** D
	Task No. 4

Task: Operate centrifuge using knowledge or specimen requirements to separate solids from liquids.

Achievement Indicators: The learner:	Yes	No
1. Wore protective/safety gear as indicated -	____	____
2. Checked carriers for presence of tubes and balance -	____	____
3. Balanced liquids in tubes to be centrifuged -	____	____
4. Balanced tubes in centrifuge (180^{o} between samples) -	____	____
5. Selected time and speed -	____	____
6. Turned on centrifuge using "on with timer" switch set to desired time -	____	____
7. Adjusted tachometer to desired RPM -	____	____
8. Removed centrifuged specimen when centrifuge shuts off -	____	____
9. Decanted supernant liquid without disturbing solid -	____	____
10. Labeled supernant liquid -	____	____
11. Cleaned centrifuge and work area -	____	____
12. Returned materials to appropriate cabinets -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to standard laboratory procedures.

Tools and Equipment:

Centrifuge, centrifuge tubes, transfer tubes, labels, laboratory markers

Resources:

Medical Laboratory Skills - Wittman, Thomas

Duty: Operating Laboratory Equipment	**Duty No.** D
	Task No. 5

Task: Operate timing device using activator arm to indicate correct intervals.

Achievement Indicators: The learner:	Yes	No
1. Set for desired time in seconds, minutes, hours -	____	____
2. Activated with switch or arm -	____	____
3. On sound indicating time up:		
a. Removed specimen -	____	____
b. Observed specimen -	____	____
c. Changed specimen to another reagent -	____	____
4. Made appropriate response, read and recorded results -	____	____

Criteria: Competence in the task will be recognized wnen the achievement indicators are performed successfully according to operator manual.

Tools and Equipment:	**Resources:**
Timing device	Operator's manual

Duty: Collecting Specimens	**Duty No.** E
	Task No. 1

Task: Select blood collection equipment using laboratory request slips and knowledge of test requirements to prepare to collect blood specimens.

Achievement Indicators: The learner:	Yes	No
1. Checked laboratory's written guidelines to determine possible need for special collection equipment and/or tubes, observing requests for timed collection -	____	____
2. Assembled collecting tray, to include:		
a. Some type of tourniquet -	____	____
b. Skin antimicrobial and means for its application -	____	____
c. Blood collection device(s) and needles -	____	____
d. Collection tubes appropriate for specimen(s) desired -	____	____
e. Gauze/cotton and tape/bandaids to ensure closure of incision made for collection of blood specimen -	____	____
f. Any additional devices not ordinarily included, but which are necessary for a particular collection -	____	____
g. Pens, pencils, labels, timers, slides -	____	____
3. Checked with appropriate source (e.g., supervisor, nursing floor, physician's office), if laboratory request included unfamiliar tests or tests not covered in laboratory's written guidelines -	____	____

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Criteria: Competence in this task will be recognized when the achievement indicators are performed in manner consistent with laboratory policy.

Tools and Equipment:

Assorted containers, single/multiple sample needles, gauze, antimicrobiol soln, bandaids, tourniquet, timer, slides, pens, pencils, lab markers, labels

Resources:

Bibliography: 3, 4, 5, 15, 17, 18, 22, 27

"So You're Going to Take a Blood Specimen" - College of American Pathologists, Chicago, Illinois, 1980

Filmstrip: Blood Collecting - Hemotology - Prentice-Hall

Teacher Activities	Student Learning Activities
1. Have you had blood taken? a. Reactions b. Pluses of experience c. Minuses of experience 2. What does your mom/dad do before removing a splinter from your finger? Why? Discussion. Why blood is taken. How blood is taken. Need to obtain "good" sample. Advantages of venous over capillary sample. Advantage of winning the patient's confidence. Have as much student involvement in why/how/what of patient needs. Pen/paper assessment. Have students write fictitious account of positive/negative experience in blood drawing from technician's point of view, from patient's or patient's family's point of view.	1. Read the pamphlet "So You're Going to Take a Blood Specimen." 2. Set up phlebotomy trays for general blood letting. 3. Set up phlebotomy tray with supplies for capillary puncture. 4. Run quality control check of all vacutainer types. 5. Practice opening sterile syringes, needles. 6. Pass written assessment. 7. Pass practical assessment for setting up a complete phlebotomy tray.

Duty: Collecting Specimen	**Duty No.** E
	Task No. 2

Task: Collect specimen(s), using knowledge of test requirements and necessary collection equipment, to obtain clinical specimens for laboratory testing.

Achievement Indicators: The learner:	Yes	No
1. Checked laboratory's written guidelines for type of patient preparation required for laboratory test(s) required:		
a. Identified patient (orally, name bracelet and bed chart) -	____	____
b. Checked patient chart and/or questioned patient directly, to ascertain completeness of patient preparation for laboratory test(s) -	____	____
c. Washed hands -	____	____
2. Obtained appropriate collection containers (observing requirements for their type, contents and sterility) and any additional materials needed to obtain specimen -	____	____
3. Labeled collection containers (name room number, hospital number, date, time, technician's initials) -	____	____
4. Explained collection procedure to patient and, if patient is to be responsible for collection, asked questions to ascertain patient's understanding of procedure -	____	____
or		
5. Delivered collection material and directions for collection to nursing floor -	____	____
6. Checked specimen returned by nursing floor or patient with regard to:		
a. Presence of original container	____	____
b. Mixing of contents with preservative (if required)	____	____
c. Observation of time sequence, etc. -	____	____
7. Rejected unsatisfactory specimen and arranged for collection of appropriate substitute -	____	____
8. Collected specimen by:		
a. Selected suitable site after carefully examining both arms -	____	____

	Yes	No
b. Placed tourniquet 2-3 inches above antecubital area of arm -	____	____
c. Cleansed area with microbial solution and let dry -	____	____
d. Secured vein by pulling skin taut with thumb (DO NOT TOUCH AREA) -	____	____
e. With bevel tip of needle up, punctured skin and vein in single motion -	____	____
f. Pushed vacutainer onto needle and where blood entered vacutainer -	____	____
g. Released tourniquet and	____	____
h. Obtained as many samples as needed -	____	____
i. Placed sterile gauze over needle tip and withdrew needle from vein -	____	____
j. Instructed patient to apply gentle pressure to puncture site until bleeding stops -	____	____
k. Cleaned area of all used material and disposed of same -	____	____
l. Checked that patient was comfortable and bleeding had stopped -	____	____
m. Checked all tubes for patient identification -	____	____
9. Thanked patient, washed hands -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with written guidelines and laboratory policy.

Tools and Equipment:

Assorted containers, single/multiple sample needles, gauze, antimicrobial soln, bandaids, tourniquet, timer, slides, pens, pencils, lab markers, labels

Resources:

Bibliography: 3, 4, 5, 15, 17, 18, 22, 27
"So You're Going to Take a Blood Specimen," College of Amer, Pathologists, 1980

Duty: Collecting Specimen | **Duty No.** E | **Task No.** 3

Task: Obtain blood sample using appropriate venipuncture and capillary puncture supplies to provide a blood specimen for a laboratory test.

Achievement Indicators: The learner:	Yes	No
1. Observed isolation or other restrictions posted by the nursing service, in accordance with the hospital's written guidelines:		
a. Washed hands -	____	____
2. Confirmed patient identity and asked patient (e.g. wrist band) -	____	____
3. Explained collection procedure and offered reassurance to patient -	____	____
4. Chose a method of collection (venipuncture or capillary puncture) appropriate for the type and total amount of blood specimen desired, the patient's age (adult, pediatric, neonate) and clinical status -	____	____
5. Selected puncture site compatible with type of collection, age and clinical status of patient, presence of intravenous catheters, and necessity for maintaining available sites for future emergency procedures -	____	____
6. Assessed need for presence of additional personnel to restrain patient so that no harm arose from actual performance of collection process -	____	____
7. Recognized when some aspect of the collection (e.g. patient's clinical condition or unavailability of puncture sites) was beyond his present expertise -	____	____
8. Prepared puncture site with antimicrobial agent -	____	____
9. Applied tourniquet (if required) -	____	____
10. Collected blood specimen(s):		
a. If by vacuum, in a manner which prevents backflow of tube's contents into patient vein -	____	____
b. If by capillary puncture, in a manner which prevents dilution of specimen or damage to tissues by inappropriate squeezing of site -	____	____
11. Applied (or supervised application of) pressure in a manner designed to close puncture incision -	____	____

	Yes	No
12. Mixed tubes which contained anticoagulant -	____	____
13. Labeled tubes in accordance with laboratory's written guidelines -	____	____
14. Checked collection site to assure absence of "sharps" which might prove accidentally injurious to patient -	____	____
15. Checked puncture site to make certain bleeding had ceased and, if it had not, made arrangements for further monitoring of patient -	____	____
16. Returned all materials to collection tray -	____	____
17. Arranged for patient to resume usual activities (e.g. diet, medication) -	____	____
18. Delivered (or arranged for delivery of) blood specimens (accompanied by request slips) to appropriate laboratory site -	____	____
19. Disposed all "sharps" according to written guidelines -	____	____
20. Disposed all blood-contaminated materials (e.g. syringes, gauze) in biohazard bag destined for decontamination -	____	____
21. Washed hands -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are successfully performed according to standard laboratory policy and written guidelines of instruction.

Tools and Equipment:

As in E-1
Lancets, frosted tip slides, wax markers, lab markers, pens, pencils, capillary pipettes

Resources:

Bibliography: 3, 4, 5, 15, 17, 18, 22, 27
"So You're Going to Take a Blood Specimen," C.A.P., Chicago, 1980

Duty: Collecting Specimens | **Duty No.** E | **Task No.** 4

Task: Obtain a blood sample, using capillary puncture supplies, to provide a blood specimen for a laboratory test.

Achievement Indicators: The learner:	Yes	No
1. Assembled all supplies -	____	____
2. Identified patient (verbal and checked ID bracelet) -	____	____
3. Explained procedure to patient in a calm voice -	____	____
4. Selected a warm, pink, non-edematous finger (center or ring finger) OR ear lobe OR great toe (child, infant) OR heel (child, infant) (or alternate sites used on patient compromised by burns or injury) -	____	____
5. Cleansed area with 70% alcohol -	____	____
6. Air dry or dry with sterile gauze -	____	____
7. Firmly grasped finger, toe, ear lobe, heel and punctured with a sterile lancet to produce a free-flowing sample. (Care should be taken to go to the side of the nail.) -	____	____
8. Wiped away the first drop of blood with sterile gauze. (This drop contains tissue fluid) -	____	____
9. Gently pressed the distal end of the site to produce a free-flowing sample that is collected and diluted as tests request -	____	____
10. Quickly collected samples to avoid coagulation of the sample(s) -	____	____
11. Applied a sterile gauze with pressure to the site until bleeding stopped -	____	____
12. Cleaned up covers from containers -	____	____
13. Marked/labeled all samples with patient's name and number -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

Sterile 2 x 2 inch gauze squares, 70% alcohol, or alcohol pads, sterile disposable lancets

Resources:

Lab Techniques for High School - Barren

Basic Laboratory Techniques for the Medical Laboratory Technician - Linne, Jean J.

Textbook for Laboratory Assistants - Opperheim, Ivan A.

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 1

Task: Prepare laboratory equipment, using proper tools and knowledge of equipment operation procedures, to conduct laboratory testing.

Achievement Indicators: The learner:

	Yes	No
1. Unpacked new equipment and/or supplies, checking contents/parts against the packing slip -	____	____
2. Followed directions for assembly of new equipment and examined operating manual included with instrument -	____	____
3. Followed operating manual to assemble equipment or assisted service representative in assemblage of equipment -	____	____
4. Followed operations manual instructions in making performance check -	____	____
5. Ran duplicates in checking all instruments against effeciency of new -	____	____
6. Recorded all equipment/instrument check systems and paralled performance in maintenance log; dated and signed log -	____	____
7. Observed safety precautions during installation of/or maintenance procedures for instrumentation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory protocal, manufacturers specifications and using safety measures to protect equipment and personnel.

Tools and Equipment:

Part package of equipment
Allen wrench
Matched screwdriver set
Exacto blade

Resources:

Bibliography, 3, 7, 14, 17, 26.

Teacher Activities	Student Learning Activities
1. Do you ever get large packages? a. T.V. b. Microwave c. Computers 2. Do you open the packages? 3. Do you use special precautions? 4. Why are special precautions used? 5. How do you go about taking/ opening large expensive equipment? 6. Present different size boxes 7. Demonstrate how to place boxes/crates on table 8. Demonstrate the places on boxes that show which side of box is UP; show need to search for instruction (although it's obvious) 9. Demonstrate safe use of blade in breaking tape 10. Demonstrate safe storage of blade-sheath blade when blade is not in use 11. Offer dummy boxes for students to examine 12. Discuss why care is necessary in opening and setting up equipment 13. Develop "When all else fails . . .	1. Read instruction guide that accompanies new equipment. 2. Examine dummy boxes and handle using steps outlined. 3. Assemble small items following step by step instruction. 4. Open a dummy box that has "spillable"- instructions must be followed in order not to lose material.

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 2

Task: Perform maintenance procedures and minor repairs, using proper tools and accessories, to ensure optimal working condition.

Achievement Indicators: The learner:	Yes	No
1. Referred to operating manual for instrumentation destined for maintenance or repair -	____	____
2. Followed steps exactly as outlined in manual for instrument maintenance -	____	____
3. Checked out instrumentation, per directions in manual, to determine cause for poor performance -	____	____
4. Performed minor repair, exactly as directed by operating manual -	____	____
5. Consulted manufacturer's service representative if instrumentation did not respond as expected -	____	____
6. Arranged for loaner if instrument needed to be returned to factory for more extensive repair -	____	____
7. Observed safety precautions while engaged in maintenance procedures or minor repairs on instrumentation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to accepted policy operator's manual.

Tools and Equipment:	**Resources:**
Tool kit for specific equipment Allen wrenches Assorted screwdrivers	Bibliography: 3, 7, 14, 17, 22, 26

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 3

Task: Perform laboratory tests, using controls, standards and blanks, to ensure reliability and validity of test results.

Achievement Indicators: The learner:	Yes	No
1. Assembled test reagents -	____	____
2. Prepared working standards and reconstituted serum controls -	____	____
3. Performed specific laboratory procedure, employing standards and controls instead of, or in addition to, patient specimens -	____	____
4. Set up blank, if required by procedure -	____	____
5. Read and recorded blank, standard and control values -	____	____
6. Checked current established values for standards and controls to ascertain if obtained values fall within predetermined range -	____	____
7. Followed procedure listed in quality control manual to correct out-of-range standards and/or controls before patient specimens are rerun and values reported -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory policy.

Tools and Equipment:
Working controls
Standard calculator
Daily q.c. logs

Resources:
Bibliography: 3. 5. 7. 15. 17. 22. 23. 26

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 4

Task: Adjust temperature of equipment, using thermometer and designated QC record book(s), to maintain specified temperature range.

Achievement Indicators: The learner:

	Yes	No
1. Made daily temperature checks on all units involved in test procedure or specimen/reagent storage -	____	____
2. Checked room temperature daily if this value is crucial to test performance (e.g., syphilis serology) -	____	____
3. Indicated in some manner the permitted temerature and, the date of checking temperature, and the individual (i.e., initials) who performed each check, on a chart to be retained as a permanant quality control record -	____	____
4. Confirmed, before putting into use and periodically thereafter, accuracy of labortory thermometers, employing a standard reference thermometer (certified by National Bureau of Standards or conforming to NBS requirements) -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner consistent with laboratory policy.

Tools and Equipment:

Quality Control log
Reference thermometers

Resources:

Bibliography: 3, 5, 7, 17, 18, 19, 22, 23, 26

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 5

Task: Investigate temperature or test variations, using problem-solving technique and laboratory guidelines to ensure that temperature/test variations will not interfere with test results.

Achievement Indicators: The learner:	Yes	No
1. Investigated either trend in temperature or values falling outside permitted range -	____	____
2. Recorded corrective action taken -	____	____
3. Reported to supervisor, if correction is not feasible, so that further evaluation can be made and an alternative adopted, to avoid interference with test results -	____	____

Criteria: Competence in the task will be recognized when the achievment indicators are performed in a manner that is consistent with instruction and written guidelines.

Tools and Equipment:	**Resources:**
Quality Control log Reference thermometer	Bibliography: 3, 5, 7, 17, 18, 19, 21, 22, 26

Duty: Providing Care and Maintenance of Equipement and Supplies	**Duty No.** F
	Task No. 6

Task: Wash laboratory equipment, glassware and instruments, using appropriate cleaning materials and techniques, to prepare for reliable test results.

Achievement Indicators: The learner:	Yes	No
1. Followed laboratory guidelines in choice of cleaning agent and method for equipment, instrumentation, or glassware by:		
a. Choosing an agent and method of cleaning instrumentation which does not damage finish or electrical wiring or permanently sealed areas -	____	____
b. Employing a method and glassware cleaner which leaves no traces of reagents or protein, or of cleaning agent itself -	____	____
2. Deposited broken glassware in designated hazard container -	____	____
3. Wore band aid to protect cut or grazed skin, or gloves to cover such areas -	____	____
4. Employed test tube brushes, etc. in a manner which was not damaging to glassware nor hazardous to personnel -	____	____
5. Used protective gloves when handling hot glassware -	____	____
6. Kept instrumentation and equipment free of dust and debris by:		
a. Storing under protective covers -	____	____
b. Avoiding placing reagents and solutions to instrumentation -	____	____
c. Immediately wiping up spills which do occur -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner that is consistent with laboratory policy.

Tools and Equipment:

Alconax; 2% HCL; Clorox; Acid dichromate; Distilled water; Gloves; Hazard receptable; Oven; Drying rack

Resources:

Bibliography: 3, 5, 6, 10, 14, 18, 19, 23

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 7

Task: Sterilize laboratory equipment, glassware and instruments, using autoclaves, hot air ovens or disinfectants, to decontaminate soiled materials.

Achievement Indicators: The learner:	Yes	No
1. Sterilized non-contaminated glassware, after washing, by dry heat -	____	____
2. Pretreated certain biohazard-contaminated material (e.g., hemacytometers) with appropriate solutions (e.g., phenol, Zephiran ™) before washing -	____	____
3. Autoclaved biohazard-contaminated glassware before washing and dry-heat sterilizing -	____	____
4. Autoclaved biohazard materials before disposal -	____	____
5. Ran and recorded appropriate checks on temperature, time and efficiency (e.g., "Kilit"™ ampoules or sterilizer tape) of autoclaving procedure -	____	____
6. Decontaminated laboratory countertops with appropriate disinfectant (e.g., hypochlorite) at least daily -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner that is consistent with instruction and laboratory policy.

Tools and Equipment:	**Resources:**
Phenol, zephiran chloride slm, oven, antoclove, clorox, "Kilit" or autoclave tape	Bibliography: 3, 5, 6, 10, 17, 18, 19, 23

Duty: Providing Care and Maintenance of Equipment and Supplies | **Duty No.** F

Task No. 8

Task: Record performance of maintenance or quality control procedures, using record books, to assure appropriate function and maintenance of equipment.

Achievement Indicators: The learner:	Yes	No
1. Followed established laboratory guidelines for periodic preventive maintenance of each piece of labortory equipment -	____	____
2. Kept a running record of preventive and corrective maintenance for each piece of equipment, including:		
a. Date of preventive or corrective maintenance -	____	____
b. Type of maintenance performed and/or parts replaced -	____	____
c. Signature of individual performing maintenance -	____	____
d. Performance of equipment which necessitated corrective maintenance -	____	____
3. Carried out quality control procedures for each piece of equipment prior to and at intervals during the day's test run (as documented in the laboratory operating manuals) -	____	____
4. Maintained results of quality control procedures, in a form that permits shift, trend, or out-of-control value- to be quickly and easily identified -	____	____
5. Identified values which fell outside the control range and documented steps which were taken to correct this occurance -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner that is consistent written guidelines and operator's manuals.

Tools and Equipment:

Record books
Reference materials
Minor tools

Resources:

Bibliography: 3, 5, 6, 17, 18, 19, 22, 23, 26

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 9

Task: Inventory supplies and equipment, using proper inventory forms, to determine supply levels and to replenish supplies and equipment.

Achievement Indicators: The learner:

	Yes	No
1. Determined inventory of perishable reagents, disposable supplies, and equipment parts to appropriate time intervals, as necessary to mesh with complete hospital or laboratory inventory -	____	____
2. Used acceptable units, related to manufacturer's packaging, to assess supplies on hand, so that a useful estimate of stock supply is available to the purchasing agent and/or financial officer of the laboratory or hospital -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to established laboratory guidelines.

Tools and Equipment:

Inventory sheets
Requisition forms
Pens/pencils

Resources:

Bibliography: 19, 21, 27

Duty: Providing Care and Maintenance of Equipment and Supplies	**Duty No.** F
	Task No. 10

Task: Prepared requisitions, using required forms, to replenish supplies and equipment.

Achievement Indicators: The learner:	Yes	No
1. Determined consumption of perishable reagents or disposable supplies over an appropriate period of time, according to size of laboratory -	____	____
2. Evaluated usual length of time lapse between placing an order for, and receiving supplies -	____	____
3. Followed up on orders that were delayed or backordered, either personally or through the purchasing agent -	____	____
4. Took into account the need for keeping on hand certain crucial replacement parts for vital equipment -	____	____
5. Filled out requisitions to bring stock item supplies to established levels -	____	____
6. Replenished stock, bring forward oldest dated items to be used first, while checking for, and discarding, outdated items -	____	____
7. Checked central supply area to see if material may be stocked centrally -	____	____
8. Obtained purchase order, if ordering material and include on requisition -	____	____
9. Included name of company and contact person on requistion form -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed in a manner that is consistent with laboratory/purchasing policy.

Tools and Equipment:

Inventory sheets
Requisition forms
Supply/Equipment catalous
Addresses of usual suppliers

Resources:

Bibliography: 19, 21, 27

Duty: Preparing specimens for Analysis	**Duty No.** G
	Task No. 1

Task: Evaluate specimens using knowledge of test requirements to ensure specimen is properly prepared for required analysis.

Achievement Indicators: The learner:	Yes	No
1. Noted discrepancies in labeling (name, time, etc.) between specimen container and request slip and notified collecting station of nursing floor -	____	____
2. Checked request slip with blood specimen submitted for collection in appropriate container (e.g. without, or with appropriate anticoagulant) -	____	____
3. Ascertained absence of clots in tube containing anticoagulant -	____	____
4. Assessed appropriate volume of blood in tubes in which ratio of blood to anticoagulant was crucial to test reliability -	____	____
5. Obtained new request slip in place of one which had been contaminated with body fluid, and deposited original slip in biohazard bag -	____	____
6. Evaluated suitability of specimen container for body fluids other than blood -	____	____
7. Consulted with appropriate laboratory area on acceptance of questionable specimen -	____	____
8. Rejected unsuitable specimen(s) and noted reason for rejection on request slip, returning slip to place of origin of specimen -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to written guidelines and laboratory policy.

Tools and Equipment:	**Resources:**
Assorted requisition slips, test tube racks	Bibliography: 3, 5, 17, 18, 19, 23

Teacher Activities	Student Learning Activities
Review 1. Explain how we normally ready or "prep" things before the occasion. 2. Elicit discussion: a. Cooking examples b. Sewing c. Auto repairs Overview What/how/why the preliminary step. Presentation Give general examples: a. Preheat ovens, cutting meat b. Blocking patterns c. Separating blood for 1. Cells 2. Plasma 3. Serum Exercise Situations to examine: Examine - cells plasma serum Summary Pen/paper assessment. Components of plasma serum cells	1. Read assigned material. 2. Take notes or specimen preparation. 3. Discuss some reasons for specimen preparation. 4. Discuss reasons for meticulous care in preparation. 5. Take pen/paper assessment. 6. Perform practical exercise: a. Centrifuging b. Decanting c. Pipetting d. Preparing a cell-free transfer of plasma or serum

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 2

Task: Sort specimens, using knowledge of test requirements, to determine order of priority and plan of work.

Achievement Indicators: The learner:	Yes	No
1. Checked test requisition with labeled specimen and determined if serum and/or plasma was available for analysis -	____	____
2. Tagged "STAT" specimens and promptly dispatched them to specific work area -	____	____
3. Attached identification labels from slot tubes or anticoagulated specimen to serum or plasma tubes -	____	____
4. Entered name and specimen number from tube to appropriate work sheet in ascending order. OR Where system is computerized, keyed in data from identification label and requisition form:		
a. Electrolytes work sheet -	____	____
b. Enzymes work sheet -	____	____
c. Lipid studies work sheet -	____	____
d. Electrophoresis work sheet -	____	____
e. Routine chemistry work sheet -	____	____
f. Special chemistry work sheet -	____	____
g. Reference laboratory work sheet -	____	____
5. Rechecked test requisitions against the appropriate work sheet specimens for delivery to the appropriate laboratory section for analysis -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory or institutional guidelines.

Tools and Equipment:

Journal work sheets for various labs, pens, labels, marking pens, computer

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 3

Task: Report unusual or special conditions of the specimen, using knowledge of normal conditions, to provide proper treatment of the specimen.

Achievement Indicators: The learner:	Yes	No
1. Observed presence of hemolysis, icterus or lipemia in specimen and noted such appearance on request slip -	____	____
2. Recognized inappropriate collection or submission of any type of specimen such as:		
a. Short collection (e.g. blood for coagulation test or urine for 24-hour analysis) -	____	____
b. Specimens to be maintained at $4^{o}C$ (e.g. pH, blood ammonia) not submitted on ice -	____	____
3. Noted "stat" or other special requests and expedited submission of specimen to testing area -	____	____
4. Handled specimens with a number of requested tests and a limited amount of specimen in a special manner, referring them directly to the laboratory testing area for processing -	____	____
5. Observed special precautions for specimens labeled as "biohazard," while regarding every body fluid as a potential hazard -	____	____
6. Arranged for disposal of patient specimens in a manner that did not constitute a hazard -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with laboratory or clinic policy.

Tools and Equipment:

Safety eye wash, shower goggles, rubber apron, surgical or protective gloves, metal tongs, fume hoods, fire extinguisher, flame proof storage cabinet, biohazard containers

Resources:

Bibliography: 3, 16, 17, 18, 19, 23

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 4

Task: Label specimen(s) and tube(s), using laboratory identification system, to assure correct reporting of test results.

Achievement Indicators: The learner:	Yes	No
1. Checked labeling on original container of all submitted specimens for completeness of required information	____	____
2. Entered necessary identifying information on specimen log in testing area -	____	____
3. Labeled original container, log entry, and sub-specimen tubes in a like manner (i.e., patient name and identification number) for testing area, so that continuous identification of specimen is ensured from collection to reporting -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory collection manual guidelines.

Tools and Equipment:

Safety eye wash, shower goggles, rubber apron, surgical or protective gloves, metal tongs, fume hoods, fire extinguisher, flame proof storage cabinet, explosion proof refrigerator

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 5

Task: Heat tubes or test samples, using heat blocks, to permit test reactions to occur at designated temperature(s).

Achievement Indicators: The learner:	Yes	No
1. Checked temperature of heat blocks or water bath -	____	____
2. Placed tubes, blanks, controls (high/low) and unknowns into block -	____	____
3. Set timer for designated interval according to test requirements -	____	____
4. Activated timer -	____	____
5. Removed tubes from heat block when time interval expires OR add second or third reagent to tubes in time block -	____	____
6. Re-set timer and activate if required -	____	____
7. Removed tubes from heat block -	____	____
8. Cooled, if required; observed, added reagents and recorded or moved specimen to spectrophotometer for further observation -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to manufacturer's specifications and according to test protocol.

Tools and Equipment:

Heating block
Tubes and test specimens

Resources:

Bibliography: 11, 16
Owner's Manual

Duty: Preparing Specimens for Analysis

Duty No. G

Task No. 6

Task: Separate specimens, using centrifuge and appropriate laboratory supplies, to prepare specimen for analysis.

Achievement Indicators: The learner:	Yes	No
1. Wore gloves during specimen handling, treating each specimen as a potential biohazard -	____	____
2. Observed centrifuge times and speeds listed for each type of specimen -	____	____
3. Used serum separators, if laboratory guidelines so directed -	____	____
4. Centrifuged tubes with stoppers in place -	____	____
5. Loaded centrifuge in a manner designed to prevent tube breakage -	____	____
6. Cleaned centrifuge after spillage or breakage, employing biohazards techniques -	____	____
7. Checked label on tube before AND after transfer of part of contents to sub-specimen tube(s) -	____	____
8. Provided appropriate storage for specimen prior to testing -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory collection guidelines.

Tools and Equipment:

Gloves, centrifuge, serum separator, disinfectant, labels, marking pen, refrigerator

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 7

Task: Prepare a specimen using approved containers and sealing supplies to ship specimen(s) to other facilities for testing.

Achievement Indicators: The learner:	Yes	No
1. Assembled packing material:		
a. Box and supplies provided by reference laboratory -	____	____
b. Ice or dry ice, as appropriate -	____	____
2. Checked directions of reference laboratory as to exact type of specimen required and manner of collection and/or preparation of patient before collection -	____	____
3. Labeled specimen with appropriate information:		
a. Patient name and identification number from referring facility -	____	____
b. Date (and time) or other special collection information -	____	____
c. Name of referring facility -	____	____
4. Sealed specimen container(s) with tape, parafilm, or melted paraffin -	____	____
5. Filled out request slip for reference laboratory and attached other information pertinent to case (e.g., clinical history for viral tests, pathology report for tissue specimen) -	____	____
6. Identified outside container in a manner consistent with postal regulations, if contents fall within that jurisdiction -	____	____
7. Entered pertinent information in log book for referred specimens:		
a. Name and other identification for patient -	____	____
b. In-patient or out-patient status -	____	____
c. Referring physician -	____	____
d. Type of specimen -	____	____
e. Date(s) and time (if appropriate) of specimen collection and shipment -	____	____

	Yes	No
f. Referring facility -	____	____
8. Arranged for:		
a. Routine postal handling or -	____	____
b. Special shipment or transport of packed specimen -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to institutional and transport guidelines.

Tools and Equipment:

Transfer tubes, mailers, packing labels, reference requisitions, dry ice, packing sleeves, tape, parafilm, paraffin, biohazard labels, caution labels, postal manual, address of reference facilities

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Preparing Specimens for Analysis	**Duty No.** G
	Task No. 8

Task: Affix clinical specimens onto clean glass slides, using appropriate techniques, to prepare smears for staining procedures.

Achievement Indicators: The learner:	Yes	No
1. Hematology:*		
a. Placed small drop of blood on end of acid-washed glass slide -	____	____
b. With spreader slide at ± 35° spread/smeared blood from one end to other end -	____	____
c. Produced a smear graduated from thick to thin with a rounded (1/2 moon) feathered edge on the finished end -	____	____
2. Microbiology:*		
a. After igniting flame (Bunsen, Fisher, alcohol, incinerator coil) flamed loop, cooled -	____	____
b. Placed drop of normal saline on acid-washed slide -	____	____
c. With cooled loop, picked a colony from slant or agar plate and placed on saline on slide, spread -	____	____
d. Flamed loop to red hot, cooled, set on rack -	____	____
e. Heat fixed preparation by passing through flame 2-3 times -	____	____
*NOTE: TO PRESERVE SMEAR:		
1. Used sealing compound (paraffin/vaseline, or nailpolish, or similar) on slides that are:		
a. To be held for a period of time (e.g. mycology slide cullvres) -	____	____
b. To be viewed under oil immersion (direct or concentrated fecal preparation for parasites) -	____	____
2. labeled each smear to identify patient from whom specimen was obtained -	____	____
3. Cleaned work area and returned supplies to appropriate storage area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:

Heat source (Bunsen, Fisher, alcohol, incinerating coil), Inoculating loop, acid-washed slides, normal saline, wax markers

Resources:

Bibliography: 9, 16, 27, 28

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 1

Task: Prepare sample(s) using appropriate stains, reagents and other equipment to perform routine hematology tests (including blood counts, sickle cell tests, hemoglobin, hematocrit, platelet counts, reticulocyte count and differentials).

Achievement Indicators: The learner:	Yes	No
1. Adjusted preparation techniques according to manner of collection (e.g. venous or capillary) or blood specimen -	____	____
2. Identified samples in accordance with established laboratory procedure -	____	____
3. Entered specimen and tests requested in appropriate log -	____	____
4. Assembled stains or reagents, glassware and equipment -	____	____
5. Prepared fresh, or adjusted stored reagents, according to procedure manual and in accordance with posted dates of expiration and hazards of handling -	____	____
6. Used a length of rubber tubing to avoid direct mouth pipetting of specimen and/or reagents -	____	____
7. Employed accurate diluting techniques, making certain that the reading technologist was aware of any modification of technique necessitated by unusual composition of a specimen -	____	____
8. Carried out preparation of samples according to written guidelines -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in accordance with laboratory policy or written guidelines.

Tools and Equipment:

Standard hematology reagants, stains, and pipettes, slides and aspirators, journal/log

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23, 27

Teacher Activities	Student Learning Activities
Review Discussion: What do you think you'll find in blood? Overview Why/how blood is examined in Hematology. Why "unclotted" EDTA blood is used in hematology. Why coagulation studies are part of hematology. Presentation Slow various pieces of equipment: -pipette -hemacytometer -Aspiration -diluent Show how cells are counted. Filmstrip on hematology department and what tests mean. Exercise Display hematologic supplies and equipment. Summary Pen/paper assessment. Exercises for calculating various cellular components.	1. Read assigned material. 2. View filmstrip "Hematology: Blood Counts". 3. Practice pen/paper practices of cell counting. 4. Practice diluting rbc and wbc. 5. Practice counting rbc and wbc. 6. Practice calculating cell counts. 7. Pen/paper assessment.

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 2

Task: Perform hemoglobin test using cyanmethemoglobin method to determine hemoglobin concentration.

Achievement Indicators: The learner:	Yes	No
1. Diluted, from anticoagulated blood that is MIXED WELL OR from a free flowing peripheral puncture, 20 microliters (0.02mL) of blood with 5.0mL of Drabkin's reagent -	____	____
2. Mixed specimen well and transferred to cuvette -	____	____
3. Allowed specimen to set for 10 minutes -	____	____
4. Turned on spectrophotometer -	____	____
5. Set wavelength of spectrophotometer to 540nm -	____	____
6. Set 0 and 100% transmission using water as a blank -	____	____
7. Read % t of specimen -	____	____
8. Obtained hemoglobin level from calibration curve -	____	____
9. Recorded results on log sheet and on patient requisition -	____	____
10. Cleaned work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to manufacturer's specification or laboratory standard operating procedures.

Tools and Equipment:

Drabkin's reagent, 20 microliters capillary pipettes, cuvettes, spectrophotometer

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23, 27

Duty: Performing Hemotologic Procedures	**Duty No.** H
	Task No. 3

Task: Calculate WBC using knowledge of dilution to determine number of WBC/mm^3.

Achievement Indicators: The learner:	Yes	No
1. Used anticoagulated specimen, well mixed or free-flowing peripheral puncture with first drop of blood wiped off -	____	____
2. Drew blood to 0.5 mark in Thoma white cell pipette -	____	____
3. Diluted blood with .1N hydrochloric or 2% aqueous acetic acid to 11 mark -	____	____
4. Held pipette horizontally and removed it from aspirator -	____	____
5. Removed excess diluent from stem of pipette -	____	____
6. Shook diluted blood on shaker or manually for 1-2 minutes -	____	____
7. Expelled 3-4 drops of diluted blood from pipette to clear diluent from stem -	____	____
8. Gently released index finger control on pipette and allowed counting chamber to fill uniformly -	____	____
9. Placed hemacytometer in moisture chamber (Petre' dish with damp filter paper) and allowed to rest 2-3 minutes -	____	____
10. Counted WBC in 4 sqmm, multiplied by 50 for WBC/mm^3 counted other side and averaged two sides -	____	____
11. Cleaned work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard hematocytometry procedures.

Tools and Equipment:

Thoma white cell pipettes, aspirators, 2% aqueous acetic acid or .1N hydrochloric acid, microscope, hemacytometer ground coverslips

Resources:

Bibliography: 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 4

Task: Perform RBC using appropriate equipment and diluent to determine number of RBC/mm^3.

Achievement Indicators: The learner:	Yes	No
1. Used well mixed anticoagulated sample or free-flowing peripheral puncture with first drop removed -	____	____
2. Filled blood to 0.5 mark in erythrocyte pipette -	____	____
3. Diluted blood with Hayen's or Gower's solution to 101 mark -	____	____
4. Wiped excess diluent from stem of pipette -	____	____
5. Removed aspirator from pipette -	____	____
6. Shook on shaker or manually 2-3 minutes -	____	____
7. Placed cover on hemacytometer -	____	____
8. Expelled 4-5 drops from pipette to remove diluent from stem -	____	____
9. Controlled flow of diluted blood, filled chamber on both sides -	____	____
10. Allowed filled chamber to "rest" 2-3 minutes in moisture chamber -	____	____
11. Counted cells in 5 non-adjacent tertiary squares of hemacytometer -	____	____
12. Counted cells in 5 non-adjacent tertiary squares on opposite side -	____	____
13. Took average of both sides -	____	____
14. Multiplied average number of cells counted by 10,000 for cells/mm^3 -	____	____
15. Cleaned up equipment -	____	____
16. Returned equipment to appropriate storage area -	____	____

Criteria: Competence in the task will be recognized when the achivement indicators are successfully performed according to laboratory standard operating procedure.

Tools and Equipment:

Thoma erythrocyte pipette or unopettes, hemacytometer, microscope, coverslips, Hayemis, Gocoeri solution

Resources:

Bibliography: 16, 27
Filmstrip: Hematology CBC - Prentice Hall

Duty: Performing Hematologic Procedures | **Duty No.** H | **Task No.** 5

Task: Perform hematocrit (macro- and micro-) using appropriate supplies to determine packed cells to total volume.

Achievement Indicators: The learner:

	Yes	No
MICROHEMATOCRIT		
1. Used well-mixed EDTA sample (plain tubes) or free-flowing peripheral puncture with first drop removed (heparinized capillary (3/4) tubes) -	____	____
2. Partially filled capillary tube:		
a. Plain - blue tip - for EDTA -	____	____
b. Heparinized - red tip - for peripheral -	____	____
3. Sealed end with sealing compound -	____	____
4. Set in special rack to identify sample by number -	____	____
5. Wrote in patient's name at slot number on work sheet -	____	____
6. Placed sample(s) in microhematocrit centrifuge - balance each tube -	____	____
7. Secured cover on centrifuge -	____	____
8. Closed cover and set timer to activate centrifuge for 5 minutes -	____	____
9. Removed centrifuged specimens -	____	____
10. Read with hematocrit read or metric ruler -	____	____
11. Recorded patient data and test results in % -	____	____
12. Discarded spent tubes and cleaned work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard operating procedures and institutional policy.

Tools and Equipment:

Wintrobe tubes, 9mm Pasteur pipettes, centrifuge, plain and heparinized microcapillary tubes, sealing compound, wipes, microhematocrit centrifuge, hematocrit reader, metric rulers

Resources:

Bibliography: 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 6

Task: Performs routine hematology tests using automated hematology equipment (including microscope, microhematocrit centrifuge and reader, hemoglobinometer and automatic cell counters) to determine presence and amts of various blood components.

Achievement Indicators: The learner:	Yes	No
1. Performed and recorded quality control checks, calibration and standardization as directed (daily or for every run or periodically during run) by hematology procedure manual -	____	____
2. Prepared sample, as necessary, by:		
a. Checking volume of specimen -	____	____
b. Making a visual check for the presence of clots -	____	____
c. Dilution -	____	____
3. Rejected specimens which were inappropriately collected or prepared -	____	____
4. Estimated amounts of blood components as requested, and according to established procedure -	____	____
5. Determined standard deviation, coefficient of variation, or other statistical estimates of precision by random replicate testing of specimens -	____	____
6. Included internal (where appropriate) as well as external reference specimen in daily run (e.g. hemoglobin, hematocrit, red cell, white cell, and platelet counts) -	____	____
7. Recognized results that were inappropriate from a technical standpoint, and took steps to obtain more consistent values -	____	____
8. Evaluated unexpected results from a clinical standpoint, and brought these to the attention of supervisory personnel -	____	____
9. Adjusted daily routine to accomodate "stat" requests in a timely fashion -	____	____
10. Recorded and reported test results in a manner consistent with laboratory guidelines and, if manual, in a form that could not be misinterpreted (e.g. carelessly written figures or misplaced decimal points) -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory manuals.

Tools and Equipment:	**Resources:** Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 7

Task: Prepare a smear for differential count using appropriate slides and stains to produce a smear for examination.

Achievement Indicators: The learner:	Yes	No
1. Used well mixed EDTA specimen or free-flowing peripheral sample with first drop removed -	____	____
2. Placed small drop of blood on slide 1-2cm from end -	____	____
3. Used spreader slide at about 35 degrees to blood drop -	____	____
4. Spread drop of blood along edge of spreader slide -	____	____
5. Quickly spread blood on slide by pushing spreader slide away from drop of blood -	____	____
a. Prepared smear, THIN, with feathered edge -	____	____
6. Air dried smear -	____	____
7. Wrote in patient data on slide:		
a. Name -	____	____
b. Room Number -	____	____
c. Date -	____	____
8. Placed slide, film side up, on staining rack -	____	____
9. Flooded slide with Wright's stain for 2-3 minutes -	____	____
10. Added buffer to slide for 5 minutes (a metallic sheen should appear) -	____	____
11. Rinsed slide(s) in distilled water until thinner parts of smear appeared pinkish -	____	____
12. Dried underside of smear to remove excess stain from back -	____	____
13. Slanted slides and allowed to dry -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory protocol.

Tools and Equipment:

Acid washed slides, Wright's stain, phosphate buffer, distilled water, markers, staining racks

Resources:

Bibliography: 9, 16, 17, 18, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 8

Task: Examine blood smear using knowledge of morphology, stain and microscopy to differentiate WBCs and RBCs.

Achievement Indicators: The learner:	Yes	No
1. Placed slide on stage of microscope -	____	____
2. Focused on specimen with LOW POWER -	____	____
3. Added small drop of immersion oil -	____	____
4. Rotated to oil immersion objective -	____	____
5. Used fine adjustment and adjusted light to obtain sharply focused image -	____	____
6. Selected appropriate section of smear for examination -	____	____
7. Used differential counter to count 100 WBC -	____	____
8. Reported number of each type of WBC counted, on appropriate requisition form -	____	____
9. Reported any abnormal RBC morphology -	____	____
10. Estimated and reported approximate number of platelets -	____	____
11. Cleaned oil from lens, slide and stage -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to supervisor's instructions.

Tools and Equipment:	**Resources:**

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 9

Task: Perform a hemoglobin test using hemolysis sticks and hemoglobinometer to determine hemoglobin concentration.

Achievement Indicators: The learner:	Yes	No
1. Used well mixed EDTA sample or free-flowing peripheral puncture with first drop removed -	____	____
2. Placed one drop of blood on chamber of hemoglobinometer -	____	____
3. Used tip of hemolyzing stick(s) to lyse blood. (Rolled stick side to side in blood until the appearance of "candy apple candy") -	____	____
4. Replaced chamber cover to obtain even transparent sample -	____	____
5. Discarded hemolyzing stick -	____	____
6. Inserted chamber into holder and holder into hemoglobinometer -	____	____
7. Depressed button to turn on light -	____	____
8. Adjusted slide until uniform color appears in field -	____	____
9. Recorded results -	____	____
10. Cleaned hemoglobin chamber -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to manufacturer's and operator's instructions.

Tools and Equipment:	**Resources:**
Hemoglobinometer, hemolysis applicators, bulbs, batteries	Manufacturer's Manual

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 10

Task: Calculate erythrocyte indices using knowledge of related parts of red blood count to determine hemoglobin/cell concentration.

Achievement Indicators: The learner:	Yes	No
1. Recorded hemoglobin concentration -	____	____
2. Recorded red blood cell count -	____	____
3. Recorded hematocrit -	____	____
4. Used information to calculate mean corpuscular volume or mean cell volume: $MCV = \frac{\text{Hematocrit} \times 10}{\text{RBC in millions}}$	____	____
5. Used information to calculate mean corpuscular hemoglobin (M.C.H.): $MCH = \frac{\text{gm hemaglobin} \times 10}{\text{RBC in millions}}$	____	____
6. Used information to calculate mean corpuscular hemoglobin concentration: $M.C.H.C. = \frac{\text{gm hemaglobin} \times 100}{\text{hematocrit}}$	____	____
7. Checked and recorded patient data -	____	____
8. Recorded results on requisition form -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructional guide.

Tools and Equipment:

Data sheets showing hematocrit, hemoglobin and red cell counts, pens, paper, calculator or scratch paper

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 11

Task: Perform routine coagulation procedures using appropriate reagents and equipment to determine the patients clotting mechanisms.

Achievement Indicators: The learner:	Yes	No
1. Determined type of clotting test to be done:		
a. Lee-White clotting time -	____	____
b. Capillary clotting time -	____	____
c. Partial thromboplastin time (PTT) test (activated) -	____	____
d. Prothrombin time (PT) -	____	____
2. Capillary method for determination of clotting time:		
a. Made a deep puncture to finger or ear lobe to produce a free-flowing drop (observe aseptic technique). Wipe away first drop -	____	____
b. Activated stop watch with first appearance of blood -	____	____
c. Simultaneously filled 2' capillary pipettes to about 3/4 their length -	____	____
d. Placed capillary pipettes on a table -	____	____
e. Broke off about 1cm of 1 tube after one (1) minute -	____	____
f. Checked by breaking at 30 second intervals until fibrin strand spanned the gap between the broken ends -	____	____
g. Immediate confirmation of second tube when fibrin strand observed -	____	____
h. Recorded end point as time between first appearance of drop of blood and coagulation of second tube -	____	____
3. PT and PTT:		
a. Obtained sample in citrated tube (observed aseptic technique) -	____	____
b. Labeled specimen with vital information:		
1. Name -	____	____
2. Room number -	____	____

	Yes	No
3. Date -	____	____
c. Separated plasma and labeled and distributed or stored at 2°-10°C until tested (not to exceed 4 hours) -	____	____
d. Ran test according to standard procedures -	____	____
e. Recorded results -	____	____
f. Cleaned up work area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to institutional policy or laboratory protocol.

Tools and Equipment:

8mm chemically clean test tubes, sterile 5cc syringes, sterile hypodermic needles, sterile saline, test tube racks, stop watch, plain capillary tubes, citrate tubes

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 12

Task: Perform bleeding time using knowledge of normal limits and adverse reactions to determine deficiency or adequacy of coagulation factors.

Achievement Indicators: The learner:	Yes	No
1. Determined type of test to be done:		
a. Tourniquet test -	____	____
b. Bleeding time - Duke's Method -	____	____
c. Bleeding time - Ivy's Method -	____	____
2. Tourniquet Test:		
a. Identified patient -	____	____
b. Explained procedure to patient -	____	____
c. Placed a blood pressure cuff around patient's upper arm -	____	____
d. Inflated the cuff to 80mm of mercury -	____	____
e. Maintained cuff at 80mm for 5 minutes -	____	____
f. Removed the cuff and waited 5 minutes -	____	____
g. Examined forearm for appearance of petechiae -	____	____
h. Drew 5cm circle and counted the number of petechiae within this circle -	____	____
i. Graded results 1+ to 4+ depending on appearance of none or 0-10, 0-20, 20-50, or more than 50 petechiae -	____	____
j. Checked patient after recording results -	____	____

	Yes	No
e. Activated stop watch as soon as stab is made -	____	____
f. Blotted blood from puncture with filter paper at 30 second intervals -	____	____
g. Bleeding time recorded as timed lapsed between starting stop watch and last sign of blood on filter paper -	____	____
h. Recorded results in minutes -	____	____
i. Cleaned patient and discarded used supplies. Washed hands -	____	____
4. Bleeding Time - Ivy's Method:		
a. Identified patient (orally and checked patient ID) -	____	____
b. Explained procedure -	____	____
c. Applied blood pressure cuff to upper arm and inflated to 40mm, maintain pressure -	____	____
d. Cleansed forearm with 70% alcohol and stretched clean area between thumb and index finger -	____	____
e. Made 4mm deep incision in skin forearm -	____	____
f. Activated stop watch as soon as incision made -	____	____
g. Blotted bleeding point at 30 second intervals without touching wound, but edge of drop of blood -	____	____
h. Recorded bleeding time when last drop of blood noted -	____	____
i. Cleaned patient and discarded used supplies -	____	____
j. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

Blood pressure cuff, centimeter ruler, marking pen, filter paper, 70% alcohol lancet with 5mm tip, sterile gauze

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 13

Task: Perform clot retraction using appropriate supplies and timers to determine platelet function.

Achievement Indicators: The learner:	Yes	No
1. Identified patient (orally and checked patient ID) -	____	____
2. Explained procedure -	____	____
3. Withdrew 3ml blood in syringe -	____	____
4. Placed 2ml blood in test tube and checked for clot -	____	____
5. Set timer for one hour -	____	____
6. Placed test tube with 2ml blood in 37°C water bath -	____	____
7. Examined test tube at end of 1 hour and returned to water bath -	____	____
a. Clot retraction from sides of tube -	____	____
8. Set clock for 1 hour -	____	____
9. Examined test tube at end of 2 hours -	____	____
10. Recorded observations:		
a. At end of 1 hour -	____	____
b. At end of 2 hours -	____	____
11. Discarded used materials -	____	____
12. Cleaned work area -	____	____
13. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructional manual.

Tools and Equipment:

Sterile syringes, needles, 37°C water bath, chemically clean test tubes, timer

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 14

Task: Perform erythrocyte sedim-ntation rate (Wintrobe or Westergren) using appropriate equipment and timers to determine rate of settling.

Achievement Indicators: The learner:	Yes	No
WINTROBE:		
1. Used well-mixed EDTA sample -	____	____
2. Used 9mm Pasteur pipette to transfer blood to Wintrobe tube to mark. If using side tubes, to calibration mark -	____	____
3. Stood tube in vertical Wintrobe rack on level surface at room temperature (22°-27°C) -	____	____
4. Set timer for 1 hour -	____	____
5. Read left side markings to indicate fall of erythrocytes in one hour -	____	____
6. Recorded results in mm/hr. -	____	____
7. Used Wintrobe cleaner to clean up used material or discarded disposable materials -	____	____
8. Returned supplies to appropriate cabinets -	____	____
9. Washed hands -	____	____
WESTERGREN:		
1. Used procedure in steps 1-9 above -	____	____
2. Filled Westergren pipette -	____	____
3. Placed in Westergren rack -	____	____
4. Used procedure in steps 4-9 as above -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:

Sedirack, Westergren rack, Wintrobe rack, Westergren pipettes, seditubes, Wintrobe tubes, wipettes, level taps

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 15

Task: Perform reticulocyte count using appropriate reagents and supplies to determine adequacy of red blood cell production.

Achievement Indicators: The learner:	Yes	No
1. Mixed one (1) drop of well-mixed EDTA or peripneral blood with one (1) drop of new methylene Blue N staining solution -	____	____
2. Allowed mixed/stained specimen to stand for 10 minutes -	____	____
3. Made 5-6 thin smears using technique used to make differential smears -	____	____
4. Allowed smears to air dry -	____	____
5. Used oil immersion lens to count number of reticulated erythrocytes -	____	____
6. Expressed/reported results in percent (i.e. x/100 RBC) -	____	____
7. Recorded results -	____	____
8. Cleaned work area and returned supplies to appropriate areas -	____	____
9. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

New methylene blue N staining solution, test tubes, Thomas wbc pipettes, acid cleaned slides

Resources:

Bibliography: 9, 16, 27

Duty: Performing Hematologic Procedures | **Duty No.** H | **Task No.** 16

Task: Perform spinal fluid cell count using knowledge of handling, diluting and staining to obtain results for treatment and/or diagnosis.

Achievement Indicators: The learner:	Yes	No
For low cell count:		
1. Examined spinal fluid immediately, observed it to appear completely clear -	____	____
2. Transferred one drop of thoroughly mixed, undiluted CSF to a hemacytometer -	____	____
3. Counted cells in nine large squares -	____	____
4. Calculated results by multiplying number counted by 10/9 to obtain number of cells/mm^3 -	____	____
5. Recorded results -	____	____
For moderate cell count:		
1. Observed CSF to be slightly cloudy -	____	____
2. Mixed specimen well -	____	____
3. Drew dituent to one mark on Thoma wbc pipette -	____	____
4. Drew well mixed CSF to mark on Thoma wbc pipette (1:10 dilution) -	____	____
5. Discarded 1/3 mixture after mixing well -	____	____
6. Placed one drop of each side of hemacytometer -	____	____
7. Counted cells in $5mm^2$ (five squares - four corners and center square), added number in 10 squares -	____	____
8. Divided results by ten for number/ one square -	____	____
9. Multiplied results by 100 to get number per mm^3 -	____	____
10. Reported number of cells per mm^3 -	____	____
11. Cleaned materials, returned supplies to appropriate area -	____	____

If CSF was purulent and/or bloody:

1. Examined CSF immediately on receipt in laboratory and observed it to be purulent/bloody - ____ ____
2. Filled pipette (Thoma wbc) to 0.5 mark, wiped excess fluid from stem - ____ ____
3. Diluted with 2% aqueaus acetic acid, wiped excess fluid from stem - ____ ____
4. Shook sample for 1 to 2 minutes - ____ ____
5. Filled both sides of hemacytometer using blood count procedure - ____ ____
6. Rested hemacytometer for four minutes in moisture chamber - ____ ____
7. Counted cells in four corner squares on both sides of hemacytometer and took average number of cells counted - ____ ____
8. Multiplied results by 50 for number of white cells per mm^3 ____ ____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:

Diluent of CSF acid, cleaned slides, hemacytometer, microscopes, pens, pencils, 2% asetic acid or .1N hydro cloric acid

Resources:

Bibligoraphy: 9, 16, 27

Duty: Performing Hematologic Procedures	**Duty No.** H
	Task No. 17

Task: Perform a direct platelet count, using diluents and a microscope, to determine number of thrombocytes/cmm of blood.

Achievement Indicators: The learner:	Yes	No
1. Obtained EDTA sample of venous blood using syringe and needle. (Siliconized equipment is desirable) -	____	____
2. Drew 1% ammonium oxalate solution up to 0.5 mark in siliconized wbc pipette (regular pipet if this not available) -	____	____
3. Wiped excess ammonium oxalate from tip of pipette -	____	____
4. Drew well mixed EDTA sample of venous blood to 1.0 mark of pipette -	____	____
5. Wiped the outside of the pipette to remove excess blood -	____	____
6. Aspirated more ammonium sulfate up to the 11 mark -	____	____
7. Removed aspirator tip and shook pipette for 20-30 seconds -	____	____
8. Placed pipette on mechanical shaker and shook for 2-3 minutes -	____	____
9. Discarded the first 4-5 drops from pipette -	____	____
10. Filled both sides of hemacytometer -	____	____
11. Placed hemacytometer in Petridish with damp filter paper in bottom for 20 minutes -	____	____
12. Located central area of hemacytometer (RBC area) -	____	____
13. Counted same area as for RBC on both sides of chamber -	____	____
14. Averaged the number of cells counted -	____	____
15. Calculated platelets/cmm formula:		
Average number platelets x 1000 = using the platelets/cmm -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to institutional policy.

Tools and Equipment:

EDTA tubes, siliconized WBC Thoma pipettes, 1% ammonium oxalate, aspirator mouth piece, mechanical pipette shaker, Petridish, filter paper, hemacytometer with cover glass, hand tally

Resources:

Medical Laboratory Skills, Wittman
Lynch's Medical Laboratory Technology, Raphael
Manual of Laboratory Procedures, Hepler

Duty: Performing Urinalysis | **Duty No.** I | **Task No.** 1

Task: Observe color and appearance of urine speciman, using knowledge of their normal and abnormal characteristics, to determine the physical properties of the speciman.

Achievement Indicators: The learner:	Yes	No
1. Accessed specimen by numbering and entering in log -	____	____
2. Rejected unsatisfactory specimen and arranged for collection of appropriate substitute -	____	____
3. Offered suggestions for improved means of collection or transport when gross or microscopic appearance suggested improper handling -	____	____
4. Handled (e.g., microbiological culture performed before routine urinalysis) and preserved (e.g., refrigerated) speciman to allow for extended or repeated testing -	____	____
5. Detected abnormal urine odor and followed with appropriate further testing, observed and recorded volume -	____	____
6. Observed and recorded color and degree of transparency of each specimen, after mixing -	____	____
7. Followed up abnormal color or tubidity by checking appropriate chemical or microscopic results -	____	____
8. Related color of specimen to measurements of concentration (e.g., specific gravity or osmolarity), and checked for presence of chemical constituents (e.g., glucose or radio-opaque dyes) if there was lack of correlation -	____	____
9. Employed and recorded daily quality control checks (e.g., known solutions of low and high specific gravity) on instrumentation used to measure urine concentration, before assessing patient specimens -	____	____
10. Cleaned refractometer with disinfectant -	____	____
11. Dispatched urine to chemical testing area or begin testing -	____	____
12. Washed hands, if finished -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are perfromed according to standard laboratory guidelines.

Tools and Equipment:

Graduate cylinder
Refractometer
Urinometer

Resources:

Bibliography: 3, 5, 16, 17, 18, 19, 23, 27

Teacher Activities	Student Learning Activities
What is Urine? Discussion (brief) What/Why/How urine is a useful tool. Demonstrate ease of making physical observations. -odor -color -transparency -amount/volume -concentration Set up "dummies" so that observations can be made. Pen/Paper assessment. Use some "fixed" urines to show ease of detection and what is demonstrated.	Read assigned materials Collect urine in class -proper technique -improper technique Make observation on using format and recording observable data. Prepare "work sheets" and log data. Pen/paper assessment. Prepare graphic showing physical characteristics of urine.

Duty: Performing Urinalysis | **Duty No.** I | **Task No.** 2

Task: Perform dipstick analysis, using appropriate reagents to determine chemical content of urine specimen.

Achievement Indicators: The learner:	Yes	No
1. Read the product inserts -	____	____
2. Checked dipstick values with reference solution before daily run -	____	____
3. Adhered to procedures specified on the product inserts, especially with regard to timing, lighting and product handling -	____	____
4. Confirmed positive dipstick value (screening) with semiquantitative test and recorded both values obtained -	____	____
5. Requested information about patient ingestion of specific interfering substances when when dipstick findings appeared to be invalid, possibly as a result of such substances -	____	____
6. Conferred with clinical staff when incompatible results were no rectified by available laboratory analysis -	____	____
7. Related the dipstick values of the patient's admitting diagnosis (from request slip) and rechecked incongruous results -	____	____
8. Compared the development of urinary pathology in successive specimens from a particular patient so as to detect significant variation -	____	____
9. Recorded results promptly, accurately and legibly; and promptly released the final report, according to laboratory protocol -	____	____
10. Passed urine on to area for microscopic exam or prepared the specimen microscopy -	____	____
11. Washed hands, if finished -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to manufacturer's specifications.

Tools and Equipment:	**Resources:**
Commercially prepared multiple dipsticks Package inserts and color charts Commercially prepared "Urine-check"	Bibliography: 3, 5, 16, 17, 18, 19, 23

Duty: Performing Urinalysis	**Duty No.** I
	Task No. 3

Task: Evaluate urinary sediment, using light microscope, to determine cellular or crystalline constituents present in a urine specimen.

Achievement Indicators: The learner:	Yes	No
1. Centrifuged 12cc of specimem and poured off supernatant -	____	____
a. Cleaned slides and filtered stains to avoid introduction of contaminant artifacts into the microscopic examination -	____	____
b. Placed drop of sediment on slide and cover slipped -	____	____
2. Chose low power objective for scanning whole area under coverglass and high power objective for identification of formed elements -	____	____
3. Adjusted amount of light to provide for detection of transparent elements of low refractive index -	____	____
4. Performed urine microscopic examination promptly after receipt of specimen so as to avoid problem of morphological deterioration -	____	____
5. Related color and pH of sediment plus simple solubility tests, to nature of amorphous material in specimen -	____	____
6. Performed simple heat or chemical solubility tests to confirm identity of crystals in sediment -	____	____
7. Selected and performed confirmatory tests to establish identity of certain clinically significant sediments (e.g., hemosiderin) -	____	____
8. Recognized contaminants introduced during collection of specimen (e.g., crystals from glove powder, oil from lubricants) -	____	____
9. Correlated chemical analysis with sediment findings and both with clinical diagnosis - before releasing report of routine urinalysis -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner compatible with laboratory policy.

Tools and Equipment:

Centrifuge tubes
Centrifuge
Glass slides
Cover slips

Resources:

Bibliography: 3, 5, 9, 16, 17, 18, 19, 23

Filmstrip: "Urinalysis" Prentice-Hall

Duty: Performing Chemistry analysis	**Duty No.** J
	Task No. 1

Task: Process a specimen using heating, agitating, filtering or titrating operations to prepare a sample for additional testing.

Achievement Indicators: The learner:	Yes	No
1. Reviewed methodology in procedure manual -	____	____
2. Assembled glassware, reagents and equipment -	____	____
3. Applied appropriate operation for specimen processing -	____	____
4. Observed precautions for obtaining appropriate altered specimen (e.g. clear filtrate) -	____	____
5. Proceeded with additional testing within appropriate time frame, after specimen processing -	____	____
6. Recognized inappropriate results (e.g. cloudy filtrate), and determined reason for such results, and repeated processing -	____	____
7. Refrigerated specimens not being analyzed immediately -	____	____
8. Rinsed used glassware and placed in suitable cleaning solution using the laboratory procedure of pre-cleaning -	____	____
9. Returned equipment to pre-use condition -	____	____
10. Placed all controls in "off" position or "neutral" position if instrument is not normally left on -	____	____
11. Cleaned work area -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed to institutional and/or laboratory procedure manual standards.

Tools and Equipment:

Assorted glassware, assorted filters (size and porosity), heat block or water bath, ovens, reagents for spec. tests, procedure manual

Resources:

Bibliography: 7, 22, 26

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 2

Task: Prepare blood samples and body fluids for electrophoresis determination, using instruments, glassware, and reagents, to determine levels of various biochemical constituents.

Achievement Indicators: The learner:	Yes	No
1. Checked procedure manual for reagents and materials appropriate for type (e.g. lipid, hemoglobin, isoenzyme, etc.) of electrophoresis desired, per operator's manual from manufacturer, and laboratory manuals -	____	____
2. Assembled reagents, glassware and apparatus -	____	____
3. Performed quality control procedures, to include: a. sample handling b. serum or blood controls c. procedural control d. operator's technique e. densitometer linearity and linearity range -	____	____
4. Prepared specimen so that physical content was appropraite for electrophoretic determination: a. whole serum (NOT plasma) or b. hemolysate of whole blood or c. concentrate (e.g. from dialysis) of body fluid with low protein content -	____	____
5. Chose the proper membrane -	____	____
6. Made sample application at a point that would obtain the highest resolution -	____	____
7. Employed appropriate standards and controls for each test -	____	____
8. Applied appropriate voltage, while observing safety techniques -	____	____
9. Permitted protein separation to occur for established time interval -	____	____
10. Removed strip and applied stain appropriate for type of electrophoresis being performed -	____	____
11. Obtained quantitative values of indifidual proteins after seperation, by manual method or densitometer -	____	____

12. Recorded patient and control results and reported obtained values and normal ranges in clinically relevant terms, such as:
    a. Patient hemoglobin migrated with Hb-S and Hb-A
    b. Proteins and lipoproteins reported both as relative values (percent of total) and absolute values (g/dl) - ____ ____

13. Recognzied inappropriate results (e.g. presence of Hb-S in a Caucasian patient) and brought them to attention of supervisory personnel - ____ ____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to written laboratory procedures.

Tools and Equipment:	**Resources:**
Safety gear, procedure manuals assorted test controls, distilled water, test unknowns, reagents of standard chemical analysis	Bibliography: 3, 5, 7, 9, 18, 19, 22, 23, 26

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 3

Task: Analyze blood or body fluid samples, using flame phtometer, to determine presence and amounts of biochemical constituents.

Achievement Indicators: The learner:	Yes	No
1. Prepared flame photometer for test run by:		
a. checking the chimney		
b. Igniting the flame		
c. connecting the dilutor to a distilled water supply and, if appropriate, to the internal standard		
d. stabilizing the flame while aspirating a blank		
e. setting the internal standard reference level -	____	____
2. Performed quality control checks, standardization (one standard with a concentration near that of the sample, and a second standard with a concentration well above the normal range), and calibration on the instrument, as instructed in manufacturer's manual for operation -	____	____
3. Added appropriate internal standard element, in equal concentration, to all standards and samples, to permit reading of analyte: standard ratio on internal standard instruments -	____	____
4. Recorded control, standard and patient values -	____	____
5. Reported patient values and normal ranges in a manner that identified abnormal values -	____	____
6. Did not attempt lithium analysis of urine, since urine potassium will interfere with potassium internal standard (if such employed on this instrument) -	____	____
7. Recognized significance of automatic instrument shutdown when failure of fuel, air, flame or electric supply occurred, and reported to supervisor -	____	____
8. Carried out shutdown procedure for instrument:		
a. Flushed sample probe and internal standard feed tube (if present) with rinse and then with cleaning solution -	____	____
b. Rinsed tube and then dried with air -	____	____
c. Switched off power and air supply for short period of shutdown or		
d. Turned off fuel, power and air compressor for overnight shutdown -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to operation's manual and/or laboratory procedure manual.

Tools and Equipment:	**Resources:**
Standards, controls, test material, reagents, flame photometer	Bibliography: 3, 5, 7, 9, 18, 19, 22, 23, 26

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 4

Task: Analyze blood or urine specimen, using chloridometer, to estimate amount of chlorides in sample.

Achievement Indicators: The learner:	Yes	No
1. Followed manufacturer's directions for instrument operation -	____	____
2. Before use, polished electrodes with silver polish and rinsed well, adjusting silver wire electrodes to same length while avioding bending -	____	____
3. Calibrated instrument by running standard solution (100 mEq/1 chloride) or -	____	____
4. Adjusted direct readout (if appropriate) to 100mEq/1 chloride with standard, after correction for the blank -	____	____
5. Diluted sample in vial with mixture of:		
a. nitric acid (to provide good electrolytic conductivity) -	____	____
b. acetic acid (to provice sharper endpoint) -	____	____
c. gelatin (to give a smoother titration curve) -	____	____
6. Checked that electrodes would be fully covered by solution and then immersed silver anode -	____	____
7. Started current flow and time (which stops automatically at endpoint) and		
a. fed a constand current to the silver generator electrode so that the quantity of silver generated (and thus of chloride measured) was a function of time only -	____	____
b. held titration time between 70 and 160 seconds for greatest accuracy -	____	____
8. Adjusted method for micro chloride (or for solutions with low chloride concentrations) determinations to keep titration time within acceptable limits:		
a. reduced current through silver generator electrodes to reduce titration speed -	____	____
b. diluted standards to a range that corresponded to concentration of the specimens tested -	____	____
9. Rinsed electrode well after each analysis -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with laboratory procedure manual.

Tools and Equipment:

Standard, control and test samples, nitric acid, gelatin, acetic acid, chloridometer

Resources:

Bibliography: 7, 9, 22, 26, 16

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 5

Task: Prepare protein free filtrate, using knowledge of specimen requirements, to obtain working sample for testing purposes.

Achievement Indicators: The learner:	Yes	No
1. Pipetted 1.0ml of serum, plasma, or whole blood into a 25ml Erlenmeyer flask -	____	____
2. Added 8.0ml distilled water and mixed. (If whole blood used, pipetted 7.0ml of distilled water, 1.0ml of 10% sodium tungstate and 1ml of $2/3NH_2SO_4$) -	____	____
3. Pipetted 0.5ml of 10% sodium tungstate into flask and mixed thoroughly -	____	____
4. Pipetted 0.5ml of $2/3NH_2SO_4$ to the flask and mixed thoroughly -	____	____
5. Allowed mixture to stand for 10 minutes -	____	____
6. Filtered through Watman #1 filter paper and collected the filtrate in a lableed flask/tube -	____	____
7. Filtra obtained <u>clear</u>, <u>colorless</u> filtrate -	____	____
<u>CSF</u>		
Used:		
1. 1.0ml CSF - 8.5 ml distilled water .25ml 10% sodium tungstate .25ml $2/3NH_2SO_4$ -	____	____
2. Let stand for 10 minutes -	____	____
3. Filtered as blood/serum/plasma -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:

Distilled water, 2/3NH_2SO_4, 10% sodium tungstate, Watman #1 filter paper, 0.5ml vulumetric pipettes, 8ml volumetric pipettes, 7ml vol. pipettes, 10ml Mohr pipettes, 1ml vol. pipettes, 25ml Erlenmeyer flasks

Resources:

Thomas, Wittman - Medical Laboratory Skills
Raphael - Lynch's Medical Laboratory Technology
Todd, Sanford, Davidson - Clinical Diagnosis and Management by Laboratory Methods
Bibliography: 7, 9, 16, 22, 26

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 6

Task: Analyze blood or body fluids, using a spectrophotometer, glassware and reagents, to determine amounts of glucose.

Achievement Indicators: The learner:	Yes	No
1. Prepared a protein free filtrate using 3% Trichloroacetic Acid -	____	____
2. Allowed all reagents to come to room temperature -	____	____
3. Started water bath to heat (must be boiling when samples added) -	____	____
4. Labeled Pyrex tubes blank (b), standard (s), control (c), and patient (p) -	____	____
5. Added reagents and tested sample as follows:		

	B	S	C	P	
Distilled Water	1ml				
Working Standard		1ml			
TCA Filtrate			1ml	1ml	
*O-toluidine	5ml	5ml	5ml	5ml	(used safety bulb at this step)

	____	____
6. Capped each tube and mixed thoroughly -	____	____
7. Placed all tubes into a boiling water bath -	____	____
8. Set laboratory timer for 10 minutes -	____	____
9. Removed tubes from water bath at end of 10mm -	____	____
10. Cooled the tubes in running tap water for 4 minutes. (set timer) -	____	____
11. Transferred the content of test tubes to cuvettes -	____	____
12. Set the spectrophotometer to 630nm -	____	____
13. Zeroed the spectrophotometer and set 100% T using the reagent blank -	____	____
14. Read and recorded the absorbances of the standard (s), control (c), and patient (p) tubes -	____	____

	Yes	No
18. Calculated results using the formula: $\frac{\text{Absorbance of sample}}{\text{Absorbance of standard}} \times 200 = \text{mg/dL of glucose}$	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to standard institutional/clinical policies or owner's manual of automated equipment or test kits.

Tools and Equipment:

3% TCA filtrate, o-toluidine reagent, glucose, working standard, Pyrex test tubes with caps, boiling water bath, test tube holder, 1ml volumetric pipets, lab timer, spectrophotometer, distilled water

Resources:

Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 7

Task: Analyze blood or body fluids, using spectrophotometer, glassware and reagents to determine amount of cholesterol.

Achievement Indicators: The learner:	Yes	No
1. Prepared alcohol extract (see 4C-1)	____	____
2. Labeled (25ml glass stoppered) Erlenmeyer flasks, blank, standard and sample #s or alphas (1, 2, 3 or A, B, C) -	____	____
3. Pipetted 3ml of absolute alcohol into the flask labeled blank -	____	____
4. Pipetted 3ml of supernatant extract into tubes labeled sample(s) -	____	____
5. Pipetted 3ml of working cholesterol standard into flask labeled standard -	____	____
6. Added 2ml of working color reagent to each flask and swirled each flask as color reagent is added for 15 seconds -	____	____
7. Allowed flasks to cool for 30 minutes (color development is completed) -	____	____
8. Transfer samples from each flask to cuvettes -	____	____
9. Set spectrophotometer to 55onm -	____	____
10. Zeroed spectrophotometer and set 100%T using the reagent blank -	____	____
11. Read and recorded absorbances of the standard and samples against the blank -	____	____
12. Repeated samples using half the extract if readings are high (results x 2) -	____	____
13. Calculated with formula: $\frac{\text{abs. patient}}{\text{abs. standard}} \times 200 = \text{mg cholesterol/100ml}$	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to standard laboratory procedure.

Tools and Equipment:

Alcoholic serum or plasma extracts, working cholesterol standard, 25ml glass-stoppered Erlenmeyer flasks, 3ml volumetric pipettes, 5ml seralogical pipettes or automatic pipettes, laboratory timer, spectrophotometer

Resources:

Bibliography: 7, 16, 19, 22, 26, 27

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 8

Task: Perform glucose tolerance test using knowledge of time test materials and specimen requirements to obtain results for treatment and/or diagnosis.

Achievement Indicators: The learner:	Yes	No
1. Ascertained that patient was fasting prescribed amount of time	____	____
2. Collected FBS and urine specimen at beginning of test -	____	____
3. Administered 100g glucose drink (Glucola - commercially prepared or similar preparation) -	____	____
4. Collected specimen #2 at 1/2 hour following ingestion of glucose drink -	____	____
5. Collected specimen #3 at 1 hour following ingestion of glucose drink -	____	____
6. Collected subsequent specimens at hourly intervals -	____	____
7. Patient was kept at rest, not smoking, not eating until test completed -	____	____
8. Periodically observed patient for any adverse reactions -	____	____
9. Prepared protein free filtrate as soon as possible after specimen obtained (4) -	____	____
10. Processed specimens according to glucose analysis methods (4A) -	____	____
Autoanalyzer / Test Kits : Followed owners manual	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

See 4 & 4A
Glucola or commercially prepared 100g glucose drink, sodium flouride vacutainers, single draw needles (20, 21 gauge), alcohol swabs, dry gauze, tourniquet

Resources:

Owners manuals for kits and analyzers
Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis | **Duty No.** J | **Task No.** 9

Task: Perform bilirubin test (direct and indirect), using a knowledge of reactants, to obtain results for treatment and/or diagnosis.

Achievement Indicators: The learner:	Yes	No
1. Prepared diazo reagent by mixing 0.1ml sodium nitrite solution and 15.0ml sulfanilic acid -	____	____
2. Set up 4 tubes marked TOTAL, CONJUGATED, REAGENT BLANK, and STANDARD CHECK -	____	____
3. Added serum and reagents as follows:		

	TOTAL(T)	CONJUGATED(C)	REAGENT BLANK(RB)	STD CHECK
Catalyst	4.0ml		4.0ml	4.0ml
M/20 HCl		4.0ml		
Serum	0.5ml	0.5ml		
Standard				0.5

	____	____
4. Mixed all tubes on vortex mixer -	____	____
5. Added 0.4ml diazo reagent to ALL tubes -	____	____
6. Mixed on vortex mixer -	____	____
7. Allowed stand for two (2) minutes -	____	____
8. Added 0.2ml hydroxylamine stabilizer -	____	____
9. Mixed -	____	____
10. Added 2.5ml Fehling II -	____	____
11. Inverted each tube to mix; let stand at least 5 minutes -	____	____
12. Set spectrophotometer to 600nm and set zero (0) absorbance with reagent blank -	____	____
13. Referred absorbance of check standard to the calibration curve (if curve used) -	____	____
14. Referred absorbance of total and conjugated tubes OR		
15. Used formula: $\frac{\text{Total or conjugated absorbance}}{\text{standard absorbance}} \times \text{standard value} = \text{bilirubin in mg/dL}$	____	____

NOTE: Procedure is fully automated OR used prepared kits.

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to owner's manual to autoanalyzer or test kits or standard clinical policies.

Tools and Equipment:

Caffeine-sodium benzoate soln, sulfanilic acid, hydroxylamine stabilizer, Fehling II, M/20 HCl, sodium nitrite, spectrophotometer, 19mm cuvettes, calibration curve, vortex mixer

Resources:

Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 10

Task: Analyze blood or body fluids, using spectrophotometer, glassware, and reagents to determine amounts of urea.

Achievement Indicators: The learner:	Yes	No
1. Removed all reagents from refrigerator and brought to room temperature while allowing water bath to come to boil -	____	____
2. Set up enough tubes for unknowns plus tubes for standard and blank, label all -	____	____
3. Pipetted 1ml of filtrate (protein free) into tubes labeled for samples, 1ml of distilled water into tube - labeled blank and 1ml of working standard into tube labeled standard -	____	____
4. Added 3ml of color reagent and 3ml of BUN acid soln to each tube -	____	____
5. Mixed thoroughly and placed rack of tubes into boiling water for 15 minutes (set timer) -	____	____
6. Cooled samples to room temperature -	____	____
7. •Transferred mixtures to labeled cuvettes -	____	____
8. Set the spectrophotometer at 520nm -	____	____
9. Zeroed instrument and set 100%T with reagent/distilled water blank -	____	____
10. Read and recorded the absorbances of the standard and samples against the blank -	____	____
11. Calculated with formula: $\frac{\text{abs. patient sample}}{\text{abs. standard}} \times 30 = \text{mg/dl urea nitrate}$	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to standard laboratory policy.

Tools and Equipment:

1:10 Folin-Wu filtrate, color reagent, BUN acid solution, working urea nitrogen standard, distilled water, 1ml volumetric pipettes, Pyrex test tubes, 3ml vol. pipettes, boiling water bath, laboratory timer, spectrophotometer

Resources:

Bibliography: 3, 5, 7, 9, 18, 19, 22, 23, 26

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No.

Task: Measure blood or body fluids using pH meter to determine level of acidity or alkalinity in sample.

Achievement Indicators: The learner:	Yes	No
1. Reviewed instructions from operator's manual supplied by manufacturer -	____	____
2. Started up pH meter by connecting power cord to outlet of proper voltage -	____	____
3. Lowered electrodes into solution with care, to avoid breakage -	____	____
4. Standardized instrument at a pH close to pH value of sample -	____	____
5. Set temperature control at temperature of buffer or sample for instrumentation with manual temperature compensation -	____	____
6. Allowed time for temperature compensating probe to stabilize (reach thermal equilibrium) if instrument had automatic temperature compensation -	____	____
7. Blotted, rather than wiped, glass electrodes, to avoid transfer of body capacitance charge -	____	____
8. Washed electrodes, between measurements, with deionized water or with next solution to be measured -	____	____
9. Read controls, standards and sample pH values on digital display -	____	____
10. Stored and soaked glass (measuring electrode) and reference electrodes in buffer of proper pH -	____	____
11. Verified electrode and meter performance -	____	____
12. Standardized pH measurement system periodically, rejuvenating or replacing out-of-range electrodes -	____	____
13. Recorded and reported pH values obtained, together with normal range if appropriate -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with laboratory procedure manual.

Tools and Equipment:	**Resources:** Bibliography: 7, 9, 15, 22, 26, 27, 16

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 12

Task: Perform calcium test (titration) using knowledge of reagents to obtain results for treatment and/or diagnosis.

Achievement Indicators: The learner:	Yes	No
1. Filled micropipette with EDTA solution -	____	____
2. Prepared plastic titration cups with - BLANK - 20 microliters dionized water 100 microliters 1.25M KOH solution 10 microliters cascein solution - STANDARD - as blank, substituted 20 microliters Ca++std for water - TESTS (patients serum) 20 microliters serum for water	____	____
3. Each titration cup is titrated under a 100 watt, long wavelength ultra-violet light in a darkened area (if possible) -	____	____
4. Observed end point - sudden disappearance of flourescence -	____	____
5. Ran tests in triplicate -	____	____
6. Calculated using formula: $\frac{\text{Test titer - blank titer}}{\text{Standard titer - blank titer}} \times 10 = \text{mgCa/dL}$ $\text{mg/dL} \times 0.25 = \text{mmol/L}$	____	____
7. Cleaned the work area and rinsed the glassware -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure and operator's manual.

Tools and Equipment:	**Resources:**
EDTA soln, 1.25M KoH micro-burette, titration cups, cascein soln, calcium standard patient samples	Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 13

Task: Perform chlorides test using knowledge of reagents to obtain results for treatment and/or diagnosis.

Achievement Indicators: The learner:	Yes	No
1. Prepared protein-free filtrate -	____	____
2. Filled burette with standard mercuric nitrate solution -	____	____
3. Pipetted 2ml protein free into each labeled Erlenmeyer flask -	____	____
4. Added 4 drops of diphenylcarbazone indicator to each flask at the beginning of each titration -	____	____
5. Titrated the filtrate with mercuric nitrate until a permanent blue-violet color appears -	____	____
6. Recorded the volume of mercuric nitrate required to reach end point -	____	____
7. Repeated steps 2, 4, 5 and 6 for duplicate analysis -	____	____

Calculation:

$$V_1 \times N_1 = V_2 \times N_2$$

$$\frac{V_2 \times N_2}{0.2} \times 1000 = \text{meq } Cl^-/l$$

Knowledge that this method has a high degree of error.
(SIMILAR TO I-3)

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

Distilled water, 2/3NH_2SO_4, 10% sodium tungstate, diphenglcarbo-zone indicator, NaCl std 10 meq/l, std mercuric nitrate soln, 5ml burette, 25ml flasks, 2ml volumetric pipettes

Resources:

Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis | **Duty No.** J | **Task No.**

Task: Perform amylase test using knowledge of reactants to obtain results for treatment and or diagnosis (Somogyis Method).

Achievement Indicators: The learner:	Yes	No
1. Pipetted 5ml starch paste and 2cc of acid sodium chloride solution into each of two test tubes and placed in 40°C water bath or block -	____	____
2. Allowed tubes and contents to heat to 40°C, added 1cc plasma or serum to 1 tube and 1cc water to the other (blank) -	____	____
3. Mixed by tapping the side of the tubes and incubated for exactly 30 minutes (<u>set timer</u>) at 40°C -	____	____
4. <u>Immediately</u>, added 1cc of Copper Sulfate solution to each tube, <u>mixed</u> and added 6% sodium tungstate solution to each -	____	____
5. Stoppered and mixed by shaking the tubes -	____	____
a. Read at 420nm -	____	____
6. Determined the serum/plasma glucose by Somogyi Nelson method (see 4A) -	____	____
7. Calculated: Mg% glucose (incubated plasma/serum and starch Mg% glucose serum/plasma the units of amylase	____	____
8. Recorded results on correct form as <u>units of amylase</u> -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

Starch paste, acid sodium chloride solution, copper sulfate 5%, 6% sodium tungstate solution, test tubes, spectrophotometer, cuvettes

Resources:

Bibliography: 7, 9, 16, 22, 26, 27

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 15

Task: Analyzes blood samples using blood gas apparatus to determine amount of CO_2 and pH in blood.

Achievement Indicators: The learner:	Yes	No
1. Read instructions in operator's manual from manufacturer	___	___
2. Followed carefully procedures for sample collection and storage to avoid equalization of oxygen and carbon dioxide partial pressures between sample and ambient air	___	___
3. Performed warm-up and gas equilibrations, followed by quality control checks, standardization and calibration (manual or automated), employing suitable pH and appropriate gas (carbon dioxide and oxygen) mixtures	___	___
4. Inserted blood sample, read values, and followed a wash sequence before next sample was put on	___	___
5. Recorded and reported patient values and normal range for pH, pCO_2, and pO_2, which are measured directly	___	___
6. Calculated (or set instrument to calculate) values for HCO_3, base excess, O_2 saturation and O_2 content, if desired, and reported with normal ranges	___	___
7. Carried out (manual or automated) checks to monitor electrode performance and operation of the electronics and computer system	___	___
8. Monitored (manual or automated) electrode response during calibration and sample measurement	___	___

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory procedure manual.

Tools and Equipment:

Standard, control and test samples

Resources:

Bibliography: 7, 17, 21
7, 9, 16, 22, 26
Operator's Manual

Duty: Performing Chemistry Analysis	**Duty No.** J
	Task No. 16

Task: Analyzes blood or body fluids using radioisotope measurement instruments such as scanner, scintillation counter, liquid scintillation system and cell counting equipment to detect presence of isotopes injected or ingested.

Achievement Indicators: The learner:	Yes	No
1. Reviewed methodology in procedure manual	___	___
2. Assessed appropriateness of sample preparation, collection and transport	___	___
3. Carried out appropriate protection of personnel and environment, according to safety guidelines	___	___
4. Prepared patient specimen as directed	___	___
5. Assembled reagents and equipment	___	___
6. Performed quality control checks, standardization and calibration procedures on equipment:		
a. calibrated counting equipment per manufacturer's instructions, using standard furnished by manufacturer (if available)	___	___
b. performed and recorded background count	___	___
c. employed a minimum of 3 levels of reference standards and 1 control for each analysis run	___	___
7. Evaluated patient specimens as outlined in procedure manual	___	___
8. Recognized inappropriate results (from a technical standpoint) and took steps to ascertain patient's previous exposure to radioisotopes or problems with equipment performance	___	___
9. Recorded and reported results in an acceptable manner	___	___
10. Disposed of radioisotope waste as directed by safety considerations	___	___

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with procedure manual.

Tools and Equipment:	**Resources:**
Reference material (if first check), radio isotope measurement instruments, reagents	Bibliography: 3, 5, 6, 8, 14, 17, 18, 19, 23

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 1

Task: Prepare sterile media, using standard microbiological media and supplies, to provide nutrients for bacteriological culturing.

Achievement Indicators: The learner:	Yes	No
1. Assembled equipment and materials -	____	____
a. Triple beam balance/Mettler/Sartorius		
b. Dehydrated media and other solutions or additions		
c. Distilled water (sterile if no further autoclaving		
d. Container for liquid media		
e. Petri dishes of appropriate diameter, or tubes with screw-top closure		
f. Heating device (e.g., hot plate, water bath) if required		
g. Autoclave		
h. pH meter		
2. Checked date of expiration for dehydrated media or purchased solutions -	____	____
3. Prepared media according to manufacturer's or laboratory specifications -	____	____
4. Autoclaved media if so directed -	____	____
5. Cooled media to appropriate temperature before adding biological proteins -	____	____
6. Dispensed media into dishes, tubes, etc. -	____	____
7. Allowed media to solidify before checking pH of solid media with pH meter -	____	____
8. Labeled tubes and/or plates in a manner that would permit their later positive identification -	____	____
9. Incubated overnight 10% of media prepared, as a sterility check -	____	____
10. Incubated plates or tubes after inoculation with organisms designed to show positive and negative reactions on this medium -	____	____

The learner:	Yes	No
11. Recorded in quality control book -	____	____
a. Date of preparation		
b. Type of media		
c. Result of pH check		
d. Result of sterility check		
e. Result of positive and negative microbial growth		
f. Identifying letters or numbers		
g. Date of expiration		
h. Initials of preparer		
I2. Rejected for use any media that did no meet quality control specifications -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that adheres to manufacturer's specifications and laboratory guidelines.

Tools and Equipment:

Dehydrated media; Distilled water; Sterring rod; Assorted petri dishes; 2000ml Erlenmeyer flasks; Broth tubes; Autoclave; pH meter; Hot plate; Stirrer; magnetic

Resources:

Bibliography: 3, 4, 5, 7, 9, 12, 16

Teacher Activities	Student Learning Activities
1. Bring students into discussion revolving around "how we grow, thrive and are able to do things we do". a. need for proper food. b. examples of proper food. 2. How do we prepare food? a. measure b. weigh c. use recipes 3. Review use of balances (weighing) Review use of autoclave Review need for distilled water Review contaminants Review quality control This deals with preparing "food" for organisms "germs" suspected of causing disease. Examples of types of media and how it is prepared Set out various dishes of sterile media. Allow student to: Cough on plates Shake dandruff on plates Expectorate in broth Wipe fingers in media Prepare test (practical) situation for preparation of various media.	A. Read assignments that cover preparation of media and how media is used. 1. Cumulative Techniques and Procedures in Clinical Microbiology 2. Manual of Clinical Laboratory Methods B. Practice weight dry powder (sand, flour, before tested with dehydrated media) 1. Practice cooking "media" without burning or scorching. 2. Practice sterile techniques a. pouring plates b. pouring broth C. Pass a practical exercise Pass a written assessment

R O P E S

Duty: Performing Microbiology Procedures

Duty No. K

Task No. 2

Task: Store sterile media, using appropriate environmental conditions, to assure optimal conditions of the culture media.

Achievement Indicators: The learner:

	Yes	No
1. Checked each batch of media (whether purchased or prepared by the laboratory) for -	____	____
a. Sterility		
b. Ability to support growth		
c. Inhibitory reaction		
d. Biochemical reactions		
e. Positive and negative reactions (by use of reference organisms)		
2. Dated and stored plated and tube media according to manufacturer's directions and procedure manual -	____	____
a. In sealed plastic bags in refrigerator or		
b. At room temperature if directions so specify and in quantities sufficient only for short term use -	____	____
3. Performed periodic quality control on all media, if not used in estimated short time, to assure that expected results are obtained when inoculated with reference organisms -		
4. Identified media unsuitable for use, recorded date and reason, and discarded in an appropriate manner -	____	____
a. Contaminated media		
b. Media held beyond date of expiration		

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with manufacturer's specifications and laboratory procedure.

Tools and Equipment:

Media storage cabinets at room temperture; Plastic bags ₸ press seals

Resources:

Bibliography: 3, 4, 5, 12, 15, 17, 18, 19, 23, 16

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 3

Task: Inoculate culture media, using appropriate media, specimen and inoculation instrument, to provide nutrients for growth of microorganisms.

Achievement Indicators: The learner:	Yes	No
1. Cleaned work area and identified sample before inoculation by comparing labeled sample container with request slip -	____	____
2. Logged specimen, leaving room to record each step performed by the laboratory which leads to the final report -	____	____
a. Performed routine smear/stain according to specimen -	____	____
3. Selected media designed to maximize the potential for recovery of organisms as indicated by specific procedure (throat, sputum, stool, wound, etc.) -	____	____
4. Chose, as an inoculation instrument, at least one of the following -	____	____
a. Sterile inoculation loop (calibrated if used for urine specimens) b. Cotton or synthetic fiber swab (sterile) c. Pasteur pipette d. Calibrated pipette e. Syringe and needle f. Any additional device not ordinarily employed, but which may be advantageous for a particular specimen		
5. Inoculated the specimen onto the initial medium in a manner best designed to maximize recovery of microorganisms -	____	____
6. Streaked media in such a manner as to best assure recovery of isolated colonies, as documented in the procedure manual -	____	____
7. Employed pour plate technique if so indicated by laboratory policy -	____	____
8. Disposed of patient specimen in biohazard bag and sterilized inoculating instrument (heat, autoclaving, disposal) -	____	____
9. Cleaned work area with disinfectant -	____	____
10. Washed hands, if finished -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with laboratory procedures.

Tools and Equipment:

Journal; assorted media; incinerator coil; inoculating loop; lab marker; assorted sterile pipettes; sterile plates; sterile media; biohazard bags; disinfectant

Resources:

Bibliography: 3, 4, 12, 16, 17, 18, 19, 23

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 4

Task: Incubate inoculated media or designated specimen, using controlled incubator conditions (aerobic/anaerobic), to provide optimal conditions for growth of microorganisms.

Achievement Indicators: The learner:

	Yes	No
1. Incubated cultures, as quickly as possible after inoculation, under optimal temperature and conditions, and for an appropriate length of time -	____	____
2. Ascertained that adequate moisture was present in the incubator atmosphere to prevent drying out of cultures -	____	____
3. Provided, when such atmosphere was indicated in the laboratory procedure manual, an adequate carbon dioxide content for the incubated specimen -	____	____
4. Assured achievement of anaerobic conditions, employing such techniques as were available in that particular laboratory -	____	____
5. Performed daily maintenance to ensure incubation conditions which meet the quality control specification of the laboratory -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with laboratory procedures for specific growth requirements.

Tools and Equipment:
CO_2 jar;
Anaerobic chamber
Temperture controlled incubator

Resources:
Bibliography: 3, 4, 5, 12, 16, 17, 18, 19, 23

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 5

Task: Examine inoculated culture media or designated specimens, using knowledge of bacterial growth patterns, to determine presence of significant growth.

Achievement Indicators: The learner:	Yes	No
1. Washed hands, cleaned work area and examined microscopic growth on culture to detect any identifiable colonial characteristics -	___	___
2. Described colony in concise wording as indicated by accepted laboratory procedures, and recorded findings in a manner specified in procedure manual -	___	___
3. Performed routine (e.g. Gram) or special (e.g., acid-fast) staining according to procedure established by the laboratory -	___	___
4. Included control slides in staining method, checking positive and negative staining characteristics for reference organisms, and recorded findings on patient specimen in reference to controls -	___	___
5. Determined, for observation of colonial and staining characteristics, subsequent cultural steps -	___	___
6. Reported observable data, carri d out further studies or specific culture -	___	___
7. Returned cultures to incubator where further observation required -	___	___
8. Cleaned and disinfected the work area -	___	___
9. Washed hands -	___	___

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory procedure manual and laboratory policy.

Tools and Equipment:

Inoculated plates from incubator

Resources:

Bibliography: 1, 2, 3, 4, 5, 12, 16, 17, 18, 19, 23, 27

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 6

Task: Initiate subcultures, using subculture media and techniques, to identify significant microorganisms.

Achievement Indicators: The learner:	Yes	No
1. Disinfected work area and identified isolated colonies which were to be subcultured -	____	____
2. Inoculated media which was best suited for the purpose of further identification of the designated colony -	____	____
3. Utilized proper sterile techniques in the transfer and inoculation of designated colonies onto proper subculture media -	____	____
4. Incubated inoculated subculture media under specified conditions for the recommended time period -	____	____
5. Examined subcultures for growth, characteristic media changes, etc. -	____	____
6. Performed biochemical tests, as appropriate, to correctly identify the organism(s) recovered from culture, including appropriate controls -	____	____
7. Referred to list of significant pathogenic organisms likely to be found in each type of specimen -	____	____
8. Utilized flow sheets, differential charts, etc., containing criteria for the identification of significant pathogens -	____	____
9. Returned cultures to incubator -	____	____
10. Disinfected work area -	____	____
11. Washed hands -	____	____
12. Included differential techniques such as serology or fluroescent studies, when appropriate, and if available in the laboratory -	____	____

The learner:	Yes	No
13. Referred organism (particularly one involved in a life-threatening situation), whose identification could not be completed on site, to a reference or state microbiology laboratory, accompanied by a clinical history -	____	____
14. Reported organism(s) isolated in current approved terminology (e.g., as delineated in Bergey's Manual), including, in parentheses, alternate or former nomenclature with which the clinician may be more familiar -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with laboratory procedure guidelines.

Tools and Equipment:
Assorted agar
Inoculating loop
Incinerator coil or
Fisher or Bunsen Burner
Incubator
Disinfectant

Resources:
Bibliography: 1, 3, 4, 5, 12, 16, 17, 18, 19, 23

Duty: Performing Microbiology Procedures | **Duty No.** K | **Task No.** 7

Task: Perform mycological or parasitological evaluation, using designated reagents and equipment to examine specimen for fungi or parasite.

Achievement Indicators: The learner:	Yes	No
1. Disinfected work area and identified sample by comparing labeled sample container with request slip prior to inoculation or sample preparation -	____	____
2. Checked for proper sample collection, preservation and transport -	____	____
3. Rejected improper specimen and documented reason for rejection -	____	____
4. Performed preliminary screening procedure (e.g., 10% KOH, india ink, Gram, PAS or Giemsa stain) when necessary, for fungal specimens -	____	____
5. Inoculated proper media for mycological evaluation, according to established procedures -	____	____
6. Incubated inoculated cultures under appropriate conditions, for indicated time period -	____	____
a. Used selective media, with and without antibiotics, as indicated -	____	____
b. Employed duplicate cultures, at room and incubator (35C) temperatures -	____	____
c. Maintained room temperature at 23-27C and monitored daily -	____	____
7. Proceeded appropriately to correctly identify organism(s) by evaluation of -	____	____
a. Colony characteristics (tube, plate or slide culture) b. Microscopic characteristics c. Biochemical characteristics d. Additional staining (e.g., PAS or modified Kinyoun)		
8. Referred to flow charts, atlases, etc. as an aid in identification -	____	____
9. Performed quality control on media and stains employed in fungus identification -	____	____

The learner:	Yes	No
10. Reported organism(s) isolated in current approved terminology, including, in parenthesis, alternate or former nomenclature with which the clinician may be more familiar -	____	____
11. Determined and recorded gross characteristics (e.g., color and consistency) of specimen submitted for parasitological examination, noting other macroscopic findings (e.g., blood, mucus, pus) or parasites (e.g., proglottids or entire helminth) also present -	____	____
12. Included in processing of specimen -	____	____
a. A direct mount in saline, with and without iodine b. At least one concentration method, with and without iodine c. A permanently stained slide (e.g., trichrome), which included with each run a control slide (e.g., mixture of buffy coat and fecal specimen with at least one protozoan)		
13. Referred to atlases or charts (with attached um scale) as an aid in identification -	____	____
14. Employed an ocular micrometer (calibrated against a stage micrometer) and the values reported for each objective of the microscope to which the micrometer is attached, to determine size of organisms and artifacts -	____	____
15. Identified, by type and stage, any parasite(s) present in the specimen -	____	____
16. Carried out quality control procedures on solutions and methods employed in parasitological examination -	____	____
17. Recorded and reported -	____	____
a. Date(s) of specimen collection - b. Gross appearance of specimen(s), particularly fecal c. Organisms recovered, by genus, species and stage(s) (e.g., ova and/or adult helminths; trophozoites and/or cysts of protozoa)		
18. Disposed of specimens and any material contaminated by specimens, in biohazard bag -	____	____
19. Cleaned and disinfected work area -	____	____
20. Washed hands -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory procedure manual.

Tools and Equipment:	**Resources:**
Chemically clean glass slides; India ink; Gm. Stain kit; Giemsa stain; Inoculating loop; Incinerator coil; Selective media; Incubator; Microscope; Cover slips; Vaseline; Reference material; Flow charts	Bibliography: 1, 2, 3, 4, 5, 12, 15, 16, 18, 19, 23

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 8

Task: Evaluate viral cultures, using knowledge of viral growth, to determine presence and nature of virus in clinical specimen.

Achievement Indicators: The learner:	Yes	No
1. Determined proper sample(s) to be collected, from information on patient history, physical examination and clinical condition -	____	____
2. Assured, by prior request or current questioning, that proper sample(s) had been collected -	____	____
3. Identified sample(s) by comparing labeled sample container(s) with request slip, prior to processing -	____	____
4. Maintained record for each viral specimen for which isolation or identification was attempted -	____	____
5. Inoculated cell culture or host system according to established laboratory guidelines -	____	____
6. Referred specimen(s) to state or reference viral laboratory, accompanied by patient clinical history -	____	____
7. Included uninoculated cell culture as a control with each patient specimen -	____	____
8. Stored patient specimen at -60C or lower temperature until identification was completed -	____	____
9. Proceeded with appropriate additional testing in order to identify type and concentration of virus present -	____	____
a. Used reagents or antisera which had been checked for titers and specificity		
b. Used diluents checked for sterility, pH and sodium or chloride content		
c. Standardized red cell suspensions photometrically (or with an equivalent procedure)		
d. Recorded on work sheet actual results of titers of complement, hemolytic serum and antigen, and control sera		
e. Recorded results of positive and negative controls tested parallel with all specimens for viral serology		
10. Recorded and reported virus identified, including source and time of collection -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to standard microbiological procedures.

Tools and Equipment:
Cell culture media; Test animals; Control and reference; Cell culture; -60° to -40° freezer

Resources:
Bibliography: 3, 12, 16, 18, 19, 23

Duty: Performing Microbiological Procedures	**Duty No.** K
	Task No. 9

Task: Perform antibiotic sensitivity test, using resources and discs, to determine antibiotic choices for treatment.

Achievement Indicators: The learner:	Yes	No
1. Washed hands and cleaned work area -	____	____
2. Prepared inoculum according to Kirby Bauer method* -	____	____
3. Placed Mueller-Hinton agar plates in 35^{o}C incubator for 30 minutes (removed excessive moisture) -	____	____
4. Placed swab in prepared inoculum and removed excess inoculum by firmly pressing swab against the side of the tube -	____	____
5. "Seeded" the Mueller-Hinton agar plate by streaking the plate in 3 planes (60^{o} turns and fully streaking plate) -	____	____
6. Allowed inoculated plate to "rest" 3-5 minutes to dry inoculum -	____	____
7. Used flamed (then cooled) fine-point forceps to apply assorted antimicrobiol discs to agar (or used disc dispenser) -	____	____
8. Flamed (then cooled) forceps to press discs onto surface of agar -	____	____
9. Incubated plates within 15 minutes (in aerobic conditions without CO_2) at 35^{o}C for 16-18 hours -	____	____
10. Cleaned work area and prepared used material for decontamination -	____	____
11. Stored specimen until results read -	____	____
12. Washed hands -	____	____

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Criteria: Competence in the task will be recognized when the achievement indicators are performed according to suppliers specifications and laboratory policy.

Tools and Equipment:
Trypticase soy broth, assorted sensitivity discs, disc dispenser, forceps, inoculating loop, incinerator or alcohol lamp, wax marker or laboratory marker, 150mm petridishes, Mueller-Hinton agar or prepared Mueller-Hinton agar plates, McFarland 0.5$BaSO_4$ std

Resources:
Supplier's instructions
Bibliography: 1, 3, 4, 5, 12, 16, 17, 18, 19, 23
Diagnostic Microbiology, Finegold and Martin

Teacher Activities	Student Learning Activities
Review Present growth patterns from previous studies. Use example that shows rapid growth. Overview Why this is done - ask if they can give a reason? Can they think of how? Presentation 1. Demonstrate preparation of media and pouring plates (this is a review, plates have been prepared before). 2. Demonstrate preparation of inoculum. 3. Demonstrate removal of excess inoculum (use water or saline for demonstration) Exercise 1. Read related materials: pp 542-550 Diagnostic Microbiology - Finegold and Martin; pp 433-436 Lynch's Medical Laboratory Technology. 2. Prepare McFarland 0.5 $BaSO_4$ std. 3. Prepare inoculum. 4. Streak plates with inoculum. 5. Apply sensitivity discs. 6. Incubate plates. 7. Read sensitivity results. 8. Prepare material to be decontaminated. 9. Clean work area aseptically. Summary Use practical to evaluate application. 1. Preparation of materials (inoculum and medic). 2. Application of inoculum. 3. Application of discs. 4. Incubation. 5. Measuring area of sensitivity.	

Duty: Performing Microbiology Procedures

Duty No. K

Task No. 10

Task: Discard contaminated media and specimens, using approved containers and techniques, to maintain an environment free of contamination.

Achievement Indicators: The learner:

	Yes	No
1. Placed used media and processed or rejected specimens in biohazard bag -	____	____
2. Disposed of contaminated disposable inoculation instruments in accordance with established laboratory safety procedures -	____	____
3. Placed all material for autoclaving in designated receptacles -	____	____
4. Operated the autoclave following manufacturer's instructions and as specified by the safety manual of the laboratory -	____	____
5. Performed and recorded periodic quality control on the autoclave in a manner which insures -	____	____
a. Temperature control		
b. Timing		
c. Adequacy or sterilization (e.g., Kilit™ ampules or tape)		
6. Minimized the chance of accidental contamination of laboratory personnel by carefully following all safety procedures, according to the laboratory safety manual -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with laboratory procedure and safety procedures.

Tools and Equipment:
Lysol; Clorox; 2% glutaraldehyde; Commercial decontaminant; Autoclave; Baskets with plastic liner; Drying racks; Brushes; Rubber gloves; Safety gear; Biohazard bags; Indicator ampoules or tape

Resources:
Bibliography: 3, 4, 5, 6, 8, 12, 15, 18, 19, 23

Operator's manual for Autoclave

Duty: Performing Microbiology Procedures	**Duty No.** K
	Task No. 11

Task: Maintain stock cultures, using appropriate media, to ensure positive and negative controls for required quality control.

Achievement Indicators: The learner:	Yes	No
1. Utilized correct inoculation and isolation procedures when transferring colonies from old stock cultures to new media, in order to preserve organism viability -	____	____
2. Followed correct incubation procedures, including appropriate temperature and atmospheric requirements, when growing and maintaining stock cultures -	____	____
3. Performed and recorded periodic quality control procedures on all stock cultures to assure continued viability of the cultures -	____	____
4. Followed written instructions describing procedures for maintenance of stock cultures -	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to laboratory policy and written guidlines.

Tools and Equipment:

Inoculating loop
Incinerator coil
Assorted media

Resources:

Bibliography: 3, 4, 12, 16, 18, 19, 23

Duty: Performing Microbiology Procedures | **Duty No.** K | **Task No.** 12

Task: Prepared slides by Gram stain method, using appropriate reagents, to obtain fixed materials.

Achievement Indicators: The learner:	Yes	No
1. Prepared then smear, air dried -	____	____
2. Wrote on identifying information with laboratory marker -	____	____
3. Heat fixed smear in flame on heat top -	____	____
4. Applied 1.5% crystal violet for one minute -	____	____
5. Rinsed in flowing water -	____	____
6. Applied Gram iodine for one minute -	____	____
7. Rinsed in flowing water -	____	____
8. Decolorized with 95% alcohol or alcohol acetone until violet color stops running -	____	____
9. Washed decolorizer off -	____	____
10. Counterstain with dilute safranin for ½ - 1 minute -	____	____
11. Rinsed and allowed to drain or blot dry -	____	____
12. Cleaned work area and returned supplies to appropriate area -	____	____
13. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are sucessfully performed according to standard laboratory procedures.

Tools and Equipment:
Acid washed slides; Incinerator; Burners; Crystal violet; Gram iodine; Safranin; Alcohol; Acetone-alcohol; Staining racks; Wax markers; Laboratory markers

Resources:

Bibliography: 9, 12, 16, 18, 19, 23

Duty: Performing Microbiology Procedures

Duty No. K

Task No. 13

Task: Stain slide by AFB method, using appropriate stains, to obtained fixed material.

Achievement Indicators: The learner:	Yes	No
1. Heat fixed dried smear (c̄ all identifying data) -	____	____
2. Stained with carbolfuchsin for five minutes -	____	____
3. Washed and decolorized with acid-alcohol -	____	____
4. Washed well -	____	____
5. Counterstained with 1% malachite green or methylene blue -	____	____
6. Rinsed and placed in semi-vertical position to drain/ dry -	____	____
7. Disinfected work area and disposed of contaminated material -	____	____
8. Returned supplies to appropiate storage area -	____	____
9. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:

Staining rack
Carbolfuchsin stain
1% malachite green or methylene blue
Distilled water
Disinfectant

Resources:

Bibliography: 9, 12, 16, 18, 19, 23

Duty: Performing Microbiology Procedures

Duty No. K

Task No. 14

Task: Stain smears, using authorized reagents and stains, to prepare slides for microscopic evaluation.

Achievement Indicators: The learner:

	Yes	No
1. Assembled stains, equipment and timing device -	____	____
2. Made up stains or other solutions which can be employed for only a limited period of time -	____	____
3. Filtered or otherwise adjusted stains and buffers which required checking at each time of use -	____	____
4. Placed prepared slide in staining jars or in carrying tray in systematic fashion (e.g., all numbers to left side, all smears facing operator) -	____	____
5. Observed staining protocol without alteration or modification -	____	____
6. Checked slide microscopically (progressive staining) or decolorized appropriately (regressive staining) as procedure indicated -	____	____
7. Prepared stained slides for microscopic viewing by -	____	____
a. Cleansing reverse side of slide and air drying, followed by mounting under coverslip if desired (e.g., Hematology or Bacteriology) or		
b. Leaving slides in final xylol solution until mounting under coverslip (e.g., Parasitology, Cytology or Histology)		

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with the steps outlined in the laboratory procedure manual.

Tools and Equipment:
Microbiology stains; Funnel; Filter paper; Staining racks; Timer; Slides; Cover glass; Xylol; Mounting medium; Coverslips, Inoculating loop; Incinerator coil

Resources:
Bibliography: 2, 9, 12

Duty: Performing Microbiological Procedures	**Duty No.** K
	Task No. 15

Task: Examine stained slides (smears), using light microscope, to determine presence, nature and extent of cellular damage.

Achievement Indicators: The learner:	Yes	No
1. Checked microscope for proper working order and reported to supervisor any difficulty experienced when viewing slides -	____	____
2. Employed appropriate magnification for nature of stained smear:		
a. low power and/or high power for temporary stains under a coverglass -	____	____
b. low power and/or high power and/or oil immersion for temporary stains sealed (e.g., paraffin/ vaseline) under coverglass -	____	____
c. low power and/or high power and/or oil immersion for permanent mounting under coverglass -	____	____
3. Took care that contents of smear (e.g., temporary stains) or mounting media did not adhere to microscope objectives -	____	____
4. Cleaned microscope objectives of vision-obscuring material in a manner that was not injurious to mounting -	____	____
5. Demonstrated familiarity with normal appearance of fluid, exudate, tissue, etc. before attempting identification of abnormal findings -	____	____
6. Utilized charts, books, atlases, files of abnormal slides, and expertise of supervisor or pathologist in identification of cells, organisms, or other microscopic findings -	____	____
7. Recognized artifacts created by improper collection. preparation or staining -	____	____
8. Evaluated whole smear as well as individual cells or organisms in a systematic manner which led to deductive reasoning rather than guesswork -	____	____
9. Reported findings in a manner consistent with laboratory procedures -	____	____

The learner:	Yes	No
10. Filed slides in a form leading to easy retrieval -	____	____
11. Maintained slide files for an appropriate length of time, according to guidelines established by regulatory agencies and to laboratory protocol -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully peformed according to laboratory procedure manual.

Tools and Equipment:

Microbiology stains, microscope, coverglasses, immersion oil, Zylol, identification charts/descriptions, slide files

Resources:

Bibliography: 2, 3, 5, 6, 12, 16, 17, 18, 19, 23

Duty: Performing Microbiological Procedures	**Duty No.** K
	Task No. 16

Task: Stain slides by India Ink method, using appropriate reagents, to obtain fixed material.

Achievement Indicators: The learner:	Yes	No
1. Placed a drop of 6% glucose solution near one end of an acid washed slide -	____	____
2. Added a loopful of organisms (test material) to make thin suspension -	____	____
3. Mixed a small drop of India Ink with the suspension -	____	____
4. Used pusher slide to prepare thin, even gray smear -	____	____
5. Air dried (did not heat smear) -	____	____
6. Stained for 5 minutes with safranin -	____	____
7. Washed with gently running water -	____	____
8. Allowed to drain dry -	____	____
9. Examined with oil immersion lens for bacterial bodies (red bodies encapsulated against black background; mycelia may be visible, hyphae seen) -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedures.

Tools and Equipment:	**Resources:**
India ink, acid washed slides, safranin, water, immersion oil, microscope	Bibliography: 9, 12, 16, 18, 19, 23

Duty: Performing Microbiological Procedures | **Duty No.** K | **Task No.** 17

Task: Prepare mycological "wet prep" slides, using knowledge of aseptic technique and appropriate materials, to obtain usable preparation.

Achievement Indicators: The learner:	Yes	No
1. Identified source of material -	____	____
2. Selected appropriate method for "wet preparation" -	____	____
3. Use 10% KOH or NaOH to suspend scrapings from skin or nails -	____	____
4. Used undiluted body fluids -	____	____
5. Placed drop of material on slide -	____	____
6. Rimmed edge of cover slip with vaseline and coverslipped the drop of suspended material -	____	____
7. Examined preparation immediately (organisms multiply at room temperature) -	____	____
8. Identified various organized material and organisms -	____	____
9. Prepared specimens of culture if further study was needed - or	____	____
10. Wrapped specimen for autoclave and decontamination and disposed of sterilized specimen -	____	____
11. Cleaned work area with disinfectant -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard procedure and accepted policy of asepis.

Tools and Equipment:
10% KOH or 10% NaOH, inoculating loop, burner, slides, cover-glasses, incinerator, vaseline, microscope, autoclave

Resources:
Bibliography: 9, 12, 16, 19, 23

Duty: Performing Microbiological Procedures	**Duty No.** K
	Task No. 18

Task: Process specimens for inoculation of T.B. organisms, using knowledge of growth requirements, to obtain optimal growth.

Achievement Indicators: The learner:	Yes	No
1. Used safety precautions for biohazardous material -	____	____
2. Transferred specimen into a heavy, round-bottom, screw capped bottle/tube -	____	____
3. Added an equal amount of sterile 4% NaOH -	____	____
4. Mixed and shook forcefully for 15 minutes in a shaker -	____	____
5. Centrifuged at 3000 rpm for 15 minutes -	____	____
6. Decanted supernatant (used caution to dispose of supernatant) -	____	____
7. Added/dropped bromthymol blue to sediment -	____	____
8. Neutralized sediment with IN HA -	____	____
9. Used pasteur pipette to secure sediment, inoculated Petragnani media and prepared smear for acid-fash stain -	____	____
10. Incubated tubes in near horizontal position, with loosened caps, at 35°C for 6-8 weeks in dark -	____	____
NOTE: Cultures are checked and aerated once weekly and the surface of the media in microscopically examined before cultures are discarded.		
11. Decontaminated supernatant liquid and discarded -	____	____
12. Cleaned work area -	____	____
(There are other acceptable methods of preparing inoculation that may vary according to institution.)		

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to standard laboratory procedure.

Tools and Equipment:

Sterile 4% NaOH, heavy round-bottom, screw capped tubes, shaker, centrifuge, disinfectant, IN HA, Bromthymol blue, pasteur pipettes, petragnani media, acid washed slides

Resources:

Bibliography: 9, 12, 16, 19, 23

Duty: Performing Serologic Procedures	**Duty No.** L
	Task No. 1

Task: Prepare samples of blood or body fluids, using reagents and glassware, to process these materials for further examination.

Achievement Indicators: The learner:	Yes	No
1. Identified patient by comparing specimen label with request slip -	____	____
2. Reviewed methodology for examination requested -	____	____
3. Checked submitted specimen for type (e.g., blood, CSF) and interval of collection (e.g., serial specimens) if appropriate -	____	____
4. Accessed patient specimen in serology log, retaining assigned identification on all glassware (e.g., tubes, slides) carrying the specimen through analysis -	____	____
5. Assembled reagents, standards and controls, glassware and equipment -	____	____
6. Pretreated specimen (e.g., by centrifuging or inactivating) and controls (e.g., reconstituting or thawing) before testing, according to serology procedure manual and safety handbook -	____	____
7. Observed all safety biohazard precautions -	____	____
8. Dispensed alignots of specimen to specific work site -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to procedure manual and safety handbook.

Tools and Equipment:

Test specimens, centrifuge, pipettes, clean test tubes, 56° waterbath, timer, laboratory marker, labels, reagents, standards, controls, assorted glassware

Resources:

Bibliography: 3, 5, 12, 16, 18, 19, 23

Teacher Activities	Student Learning Activities
Discussion/Questions about 1. Ideas of what serology means and how it can be useful. 2. Significance of these studies in diagnosing and treating: - some venereal diseases - fevers and malaise 3. How/what/why we study the theory and methods of antigen - antibody reactions: - allergies - vaccines Filmstrip: "Serology", Prentice-Hall. Speaker from Department of Health Demonstrate through pictures: (1) results of untreated disease. (2) methodology for testing. 1. Set up equipment for students to identify and reason why specific shape is desirable. 2. Set up practice situations for students. Practical assessment. Written assessment.	1. Students will read assignment materials. 2. Prepare discussion on why biohazard safety precautions must be employed. 3. Prepare charts that outline various tests and results. 4. Prepare procedure cards that indicate preparation procedures for specific tests. 5. Pass practical exercise. Pass written assessment.

Duty: Performing Serologic Procedures	**Duty No.** L
	Task No. 2

Task: Examine prepared slides of blood or body fluids, using fluorescent microscope, to detect presence of antibodies or organisms in samples.

Achievement Indicators: The learner:	Yes	No
1. Checked laboratory written guidelines to determine techniques for handling of particular type of specimen -	____	____
2. Prepared fluorescent microscope for use according to guidelines in procedure manual and manufacturer's directions -	____	____
3. Ascertained that slide preparation was in accordance with laboratory written guidelines -	____	____
4. Rejected unsatisfactorily prepared specimen and arranged for substitute -	____	____
5. Assembled reagents, stains and equipment -	____	____
6. Carried out methodology (e.g., addition of labeled or unlabeled antisera or antigen) according to procedure manual, observing type of buffer, times of incubation, and adequacy of rising procedure -	____	____
7. Employed controls as specified in methodology -	____	____
8. Recorded and reported results according to laboratory guidelines -	____	____
9. Performed quality control procedures on fluorescent equipment at specified periods -	____	____
10. Discarded specimen following safety policy and disinfected work area -	____	____
11. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to manufacturer's specifications or laboratory procedure manual.

Tools and Equipment:	**Resources:**
Pregnancy test kits	Bibliography: 3, 5, 9, 12, 13, 19, 23

Duty: Performing Serological Procedures	**Duty No.** L
	Task No. 3

Task: Perform blood samples, using glassware, reagents and ASO, heterophile RA and similar tests, to detect specific antibodies.

Achievement Indicators: The learner:	Yes	No
1. Reviewed test methodology in procedure manual -	____	____
2. Checked for appropriate serum preparation (inactivation, freedom from red cells, etc.) -	____	____
3. Reconstituted reagents and performed appropriate dilutions, according to manufacturer's directions -	____	____
4. Included controls and standards in test run to check reagent quality:		
a. positive and negative controls with each test or batch of tests -	____	____
b. for rubella - additional controls of graded reactivity, plus controls to check all test components -	____	____
5. Did not report test results unless controls were satisfactory -	____	____
6. Performed test on patient specimen according to laboratory guidelines -	____	____
7. Interpreted test results in relation to control results -	____	____
8. Recorded results of standards, controls and patient specimens -	____	____
9. Reported results in quantitative terms (e.g., dilution or units) as directed by laboratory guidelines, together with "normal" ranges and values expected in a disease or vaccinated state -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to methods in procedure manual.

Tools and Equipment:

Assorted serology kits

Resources:

Bibliography: 3, 4, 5, 12, 16, 18, 19, 23

Duty: Performing Serological Procedures	**Duty No.** L
	Task No. 4

Task: Perform VDRL, RPR or other similar tests, using specified reagents, glassware, and equipment, to detect the presence of serum factors indicating venereal disease.

Achievement Indicators: The learner:	Yes	No
1. Checked and recorded quality control on:		
a. Room temperature -	____	____
b. Dispensing volume of antigen and saline needles, if used -	____	____
c. Speed of rotator -	____	____
d. Accuracy of time device(s)		
2. Recorded lot numbers of antigen and control sera -	____	____
3. Assembled glassware, equipment, reagents, controls, according to those specified in USPHS Publication No. 411, if test was described in that manual -	____	____
4. Performed tests on patient specimen and control sera (nonreactive, weakly reactive, and reactive), according to procedure manual -	____	____
5. Read test in appropriate manner (micro- or macroscopically) -	____	____
6. Followed reactive qualitative tests by performing quantitative test, according to laboratory guidelines -	____	____
7. Reported results of quantitative (for reactive sera) or qualitative (for nonreactive sera) tests -	____	____
8. Referred reactive sera to state health department for confirmation or further testing, or patient data and laboratory serology results to local health department, according to laboratory guidelines -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to serology procedure manual and the guidelines of regulatory agencies.

Tools and Equipment:

Test samples, positive and negative controls, saline, droppers, rotators, timers, acid washed slides, reagents, mailers and handling instructions

Resources:

Bibliography: 3, 5, 9, 13, 18, 19, 23

Duty: Performing Serological Procedures	**Duty No.** L
	Task No. 5

Task: Perform blood or urine samples, using specified glassware, reagents and other instruments, to detect antibodies which appear in pregnant females.

Achievement Indicators: The learner:	Yes	No
1. Reviewed test methodology in procedure manual and manufacturer's kit directions, noting whether saline could be appropriate as a negative control, and how to avoid deterioration of controls supplied by the manufacturer -	____	____
2. Checked clinical information (i.e., LMP) for the patient -	____	____
3. Noted manner of specimen collection (e.g., first morning urine specimen) -	____	____
4. Performed preliminary tests (e.g., urine free of protein or blood) and dilution of specimen, if necessary -	____	____
5. Assembled controls, glassware and reagents, checking expiration date -	____	____
6. Set up controls and patient samples according to laboratory protocol -	____	____
7. Observed all time sequences (e.g., slide rotation, tube agglutination or agglutination inhibition) -	____	____
8. Read and recorded actual test result (e.g., "agglutination" or "no agglutination") AND interpretation (e.g., "NEGATIVE" or "POSITIVE") -	____	____
9. Reported results of patient test, type of specimen, and type of test performed -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed according to manufacturer's specifications or laboratory procedures.

Tools and Equipment:

Commercial pregnancy test kigs such as "Pregnosticon" or similar (controls in kit), glassware, test sample, viewing lamp

Resources:

Bibliography: 3, 4, 9, 16, 17, 18, 19, 23

Duty: Performing Serological Procedures	**Duty No.** L
	Task No. 6

Task: Perform semen analysis, using knowledge of collection, counting, and microscopic characteristics, to determine count and character of sperm.

Achievement Indicators: The learner:	Yes	No
Collected ejaculate following a 4-7 day abstinence -	____	____
1. Instructed patient to collect specimen through:		
a. after checking 4-7 day abstinence -	____	____
b. masturbation		
c. coitus interruptus into chemically clean or plastic container at body temperature -	____	____
d. use of specially treated condom -	____	____
2. Instructed patient to note exact time and date of collection -	____	____
3. Instructed patient to hold container with specimen close to body (in order to keep warm) if transported to laboratory -	____	____
4. Made initial observation of specimen, including:		
a. amount -	____	____
b. color -	____	____
c. turbidity -	____	____
d. viscosity -	____	____
e. pH -	____	____
5. Performed microscopic examination of semen following partial liquification; checked presence of sperm and motility -	____	____
6. Prepared 1:20 dilution with sodium carbonate solution -	____	____
7. Calculated results after counting 1 sq .mm on hemocytometer (number of sperm counted x 200,000 = no./me) -	____	____
8. Prepared smear for morphology examination and used oil immersion lens -	____	____

The learner:	Yes	No
9. Reported count morphology, physical characteristics on appropriate form -	____	____
10. Set aside specimen for examination of motility -	____	____
a. 2 hours		
b. 4 hours		
c. 7 hours		
d. 15 hours		
e. 24 hours		
11. Recorded percent motility with each check -	____	____
12. Cleaned work area ater final check -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to institutional policy and laboratory procedure manual.

Tools and Equipment:
Special condoms, graduated cylinder, glass slides, chemically clean glassware, cover slips, microscope, Wrights or Gram stain, sodium, carbonated soda, hemocytometer, pHydrion paper or nitrogine paper

Resources:
Bibliography: 3, 4, 5, 9, 16, 17

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 1

Task: Store blood products, using temperature-controlled refrigerator, to protect specimens for use in transfusions.

Achievement Indicators: The learner:	Yes	No
1. Followed established criteria for storage of blood products, especially with respect to:		
a. temperature requirements	___	___
b. expiration date	___	___
c. labeling	___	___
d. limited storage in refrigerator to blood, components, or reagents	___	___
2. Ensured the proper functioning of storage units by checking for:		
a. temperature recording system	___	___
b. fan system	___	___
c. alarm systems	___	___
d. emergency power system	___	___
e. on a daily basis to allow for adequate preservation of blood products	___	___
3. Checked out method for maintaining blood products within permissible temperature range in the event of power failure to the primary power system, according to established hospital or laboratory procedures	___	___
4. Transferred (or arranged for transfer) of blood or components to patient site, employing container which maintains the temperature within the acceptable range	___	___

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to blood bank manual of procedures.

Tools and Equipment:

Temperature controlled refrigerator, 24 temp. log, lab pens, pens, reference thermometer, daily log records

Resources:

Bibliography: 3, 20
3, 9, 16, 19, 20, 24, 25

Teacher Activities	Student Learning Activities
Review 1. Dating materials and storing them properly. 2. How what we have done previously relates to this. Why? 3. Questions/discussions covering necessity of this exercise. Overview 1. What/why/how this exercise is to be done. 2. Expected outcomes. Why? 3. Establish validity of exercise and relate to quality control. Presentation 1. Demonstrate some types of guages or instruments use to indicate temperature control. a. 24 hr. charts/dials b. Alarms c. Picture of auxiliary power system, fans 2. Demonstrate journals used to maintain records. 3. Indicate measures to be taken in event of power failure. Exercise 1. Set out charts, graphs and examples of journal sheets for student examination. 2. Take on tour of hospital blood or American Red Cross to see theory in practice. Summary 1. Summarize why this exercise sets basis for quality blood banking procedures.	Read assignments in "Technical Manual of AABB" and other reference material. Prepare charts of various instruments used to check temperature and avert any problems. Practice reading charts and gauges. Pass practice exercise. Pass written assessment.

Teacher Activities	Student Learning Activities
2. Practical exercise checking gauges and charts. 3. Written assessment.	

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 2

Task: Prepare blood products, using refrigerated centrifuge, to provide products for transfusion.

Achievement Indicators: The learner:	Yes	No
1. Prepared blood products from donor unit according to established standards	___	___
2. Labelled blood products, to include:		
a. name of product	___	___
b. anticoagulant employed	___	___
c. storage temperature to be employed	___	___
d. expiration date	___	___
e. identity of collecting facility	___	___
f. ABO group and Rh_0 (D) type (if appropriate)	___	___
g. interpretation of tests for unexpected antibodies to HBsAg (if appropriate)	___	___
h. cryoprotective agent or suspension medium (if appropriate)	___	___
3. Maintained sterility of blood and blood products by:		
a. utilizing only sterile equipment	___	___
b. maintaining sterile work area	___	___
4. Stored the product immediately, following protocol, with proper labeling and under approved temperature conditions	___	___
5. Initiated records for blood products, while maintaining records for original donor unit, providing the ability to trace a unit of any blood or blood component from source to final disposition	___	___

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with procedure manual of blood bank.

Tools and Equipment:

Double, triple renwal bags, refrigerated centrifuge, marking pens, plasma/cell extractor, labels, Group/Type labels

Resources:

Bibliography: 3, 9, 16, 19, 20, 22, 24, 25

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 3

Task: Prepare blood products using refrigerated centrifuge, to provide leukocytes packed cells (erythrocytes) and plasma for transfusion.

Achievement Indicators: The learner:	Yes	No
1. Selected correct group and Rh type donor bag -	____	____
2. Plasma transferred to satellite bag with plasma (225g) extractor -	____	____
3. Weighed plasma bag - about 225ml -	____	____
4. Buffy layer removed for leukocytes -	____	____
5. Labeled bags with complete identification: - Name, date - Address, phone number - Age, sex, social security number, or driver's license - Group and Rh type - Antibody screening - Expiration date - Tests for syphilis and hepatitis - Source of donor (where blood drawn)	____	____
6. Spun plasma at 4170/2minutes for cryoprecipitate (Before preparing heavy spin components see 3A)	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to AABB and Transfusion Services and institutional practice.

Tools and Equipment:	**Resources:**
Satellite bags, refrigerated centrifuge, marking pencils, plasma extracts	Bibliography: 16, 20, 24, 25

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 4

Task: Freeze red cells using approved procedures and containers to preserve cells for transfusion.

Achievement Indicators: The learner:	Yes	No
1. Prepared red blood cells from whole blood, following established procedures, to result in approximately 70% viability of red cells -	____	____
2. Assured that red cells were frozen within six days of blood collection:		
a. Slowly added glycerol to cells -	____	____
3. Maintained proper records of:		
a. Original donor unit -	____	____
b. Treatment of donor unit -	____	____
c. Expiration date of frozen product -	____	____
4. Placed in protective bags prior to storing in freezer -	____	____
5. Completely labeled cell pack:		
- Name of donor, address - Age, sex, social security number or driver's license - Group, Rh type - Antibody screening - Expiration date - VD tests, hepatitis - Donor source	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner that is consistent with Manual of AABB and laboratory policy.

Tools and Equipment:

Glycerol, freezer - 65-85°C, liquid nitrogen, markers

Resources:

Bibliography: 3, 16, 19, 20, 22, 24, 25

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 5

Task: Inspect units of blood using expiration data and knowledge of the physical characteristics of units of blood to insure that expiration dates have not passed and that units appear normal.

Achievement Indicators: The learner:	Yes	No
1. **Observed blood bank protocol and AABB guidelines in accepting blood for storage that had been released but not used**	____	____
2. Checked labels for expiration dates, noting preservative employed, and whether blood units had been entered, according to AABB guidelines	____	____
3. Observed blood unit for color and consistency which might suggest changes due to contamination of the unit	____	____
4. Removed expired units and salvaged for plasma, or disposed of according to AABB guidelines	____	____
5. Removed units suspected to contamination to a separate storage area, and initiated bacteriological procedures which might confirm such suspicion	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed in a manner consistent with AABB guidelines.

Tools and Equipment:	**Resources:**
Pens, log sheets	Bibliography: 3, 16, 19, 20, 22, 24, 25

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 6

Task: Group type blood samples using typing sera, to classify blood according to blood group and Rh factor.

Achievement Indicators: The learner:	Yes	No
1. **Checked specimen submitted for testing:**		
a. age of specimen	____	____
b. anticoagulant employed in collection	____	____
c. appearance (e.g., hemolysis) of specimen	____	____
2. Rejected unsuitable specimen and obtained substitute	____	____
3. Identified the specimen according to blood bank guidelines	____	____
4. Reviewed procedure in blood bank manual	____	____
5. Assembled glassware, reagents and controls	____	____
6. Performed grouping and/or typing tests, adhering to manufacturer's recommendations EXACTLY for products employed, and to blood bank procedures and AABB guidelines	____	____
7. Observed temperature requirements appropriate for each type of test	____	____
8. Employed forward and reverse groupsing ("back-typing") to confirm the ABO grouping, recognizing and resolving inconsistencies	____	____
9. Recorded results of all intermediate steps leading to interpretation of the final result, on the worksheet	____	____
10. Performed D^u testing on ALL Rh negative cells and recorded results	____	____
11. Included a patient cell control with Rh negative cells and recorded results	____	____
12. Recorded specimen identification and results of all tests, as well as any explanations necessary to clarify the meaning of these results, in accession log	____	____
13. Observed safety rules for biohazard handling	____	____

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to AABB guidelines.

Tools and Equipment:

Anti sera, test tubes, test tube racks, droppers, applicator sticks, saline, Rh viewbox

Resources:

Bibliography: 3, 9, 16, 19, 20, 22, 24, 25, 26

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 7

Task: Perform cross-match test using typing sera and cells, blood specimen and appropriate equipment to determine compatibility of blood between patient and donor.

Achievement Indicators: The learner:	Yes	No
1. Checked patient and donor specimens with regard to:		
a. Age of specimen -	____	____
b. Anticoagulant employed in collection -	____	____
c. Condition of specimen -	____	____
2. Identified the specimens according to blood bank protocol -	____	____
3. Separated serum from cells and labeled both in an approved manner -	____	____
4. Verified blood or blood product orders, per blood bank protocol -	____	____
5. Selected proper blood or blood components, as requested, for compatibility testing -	____	____
6. Obtained permission for substitute if the requested blood component was unavailable -	____	____
7. Followed established procedures, such as:		
a. Elution and absorption -	____	____
b. Antibody identification -	____	____
c. Antibody titration -	____	____
if presented with unusual technical problems during the crossmatch		
8. Notified appropriate facility, and supervisory personnel, of delay in crossmatch, including projected time for provision of suitable units -	____	____
a. Repeated #5 using 2-3 other donors -	____	____
9. Followed established procedure to initiate and maintain crossmatch records and to hold all specimens for established length of time -	____	____

	Yes	No
10. Labeled donor unit, according to established guidelines to indicate its compatibility with a particular recipient, and stored unit in the refrigerator (or section of refrigerator) maintained for crossmatched blood -	____	____
11. Released blood, according to established hospital and blood bank guidelines, on presentation of approved patient identification -	____	____
*12. Checked all alleged transfusion reactions, per blood bank and hospital protocol, with appropriate testing, including pre- and post-transfusion specimens from recipient, and recording all results in both blood bank and on patient record -	____	____

*NOTE: Done in event of reaction - not usual sequenced step in x-match procedure.

Criteria: Competence in this task will be recognized when the achievement indicators are performed according to procedure manual of AABB.

Tools and Equipment:

Test tubes, racks, water bath, coombs, saline, droppers, donor plasma + cells, recipient plasma + cells

Resources:

Bibliography: 3, 9, 16, 19, 20, 22, 24, 25

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 8

Task: Dispose of used blood containers and pilot tubes using expiration date and knowledge of aseptic technique to get rid of contaminated material.

Achievement Indicators: The learner:	Yes	No
1. Prepared bloods to be: - sent to American Red Cross - De-contaminated (as institutional policy dictates)	____	____
2. Placed pilot tubes in bags to be autoclaved -	____	____
3. Autoclaved bags according to manufacturer's specifications for bacteria, fungi or spore forming bacteria -	____	____
4. Placed autoclaved bags into appropriate disposal containers -	____	____
5. Cleaned work area -	____	____
6. Washed hands -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory policy, manufacturer's specifications and the Technical Manual of the AABB.

Tools and Equipment:	**Resources:**
Autoclave, autoclave bags or baskets, disposal bags	Bibliography: Standard Operating Blood Book Procedure Manufacturer's Instructions for Autoclave 3, 9, 19, 20

Duty: Performing Blood Bank Procedures	**Duty No.** M
	Task No. 9

Task: Perform first aid for shock using knowledge of adverse reactions to revive patient.

Achievement Indicators: The learner:	Yes	No
1. Checked for following symptoms of adverse reaction:		
a. Fainting/weakness/unconsciousness -	____	____
b. Perspiration -	____	____
c. Pallor -	____	____
d. Slow pulse rate, low blood pressure -	____	____
e. Vomiting, nausea -	____	____
2. If donation completed; or still running, stop:		
a. Place donor's head in low position, between legs, if possible, and offer ammonia inhalent -	____	____
b. Remove needle from vein -	____	____
c. Check for clear airway -	____	____
d. Apply cold compress to head or nape of neck -	____	____
3. For tetany, paresthesia and hyperventilation:		
a. Have patient breathe several times into a paper bag -	____	____
4. Treated hematoma by applying pressure to site and elevated arm -	____	____
5. Treated convulsions by restraining donor - slipped tongue blade between teeth and pressed tongue to create clear airway -	____	____
6. Offered orange juice and plain cookies after observing patients -	____	____
7. In severe reactions, donor's family/friend called to accompany her/him home -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to Technical Manual of the AABB or institutional protocol.

Tools and Equipment:

Donor record, consent form, ammonia inhalant, sphygmomanometer, blood pressure cuff, cookies, o.j., paper bags, tongue depressors

Resources:

Technical Manual of Blood Banks
Henry, Todd/Sanford/Davidson - Chemical Diagrams and Management by Laboratory Methods
Biblfography: 20, 24, 25

Duty: Performing Blood Bank Procedures | **Duty No.** M | **Task No.** 10

Task: Complete interview and basic testing of donor, using a knowledge of normal limits, to determine suitability of donor.

Achievement Indicators: The learner:	Yes	No
1. Placed prospective donor at ease and ask the following questions while completing interview form:		
a. Name, sex, race (helpful for spec. typing), social security number, driver's license -	____	____
b. Address, phone number, city, state, zip code -	____	____
c. Age 21st and 66th (betw-en 17th and 21st - depending on local law) - age of majority and approval of parent/guardian -	____	____
d. Body wieght 110 lb.+ -	____	____
e. Temperature 98°F - 99.5°F (36.7° - 37.5°C) -	____	____
f. Pulse - 50-100/minutes g. blood pressure 120/70-160/90 -	____	____
2. Performed hemoglobin following standard blood bank policy (13.5g/dl male, 12.5g/dl female) OR	____	____
Hematocrit: 41% (male); 38% female OR	____	____
Rapid screen hemoglobin (sp. gr.) $CuSO_4$ -	____	____
3. Questioned for medical history -	____	____
4. Rejected donors outside normal range with positive answers -	____	____
5. Obtained signed consent form (interview form has consent signature) -	____	____
6. Previously instructed to eat a regular meal, low in fats and abstinence from alcohol for at least 12 hours prior to donation -	____	____
7. Directed donor to phlebotomy area when all questions are answered properly -	____	____
8. Returned all clerical materials to suitable storage area -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are performed successfully according to Technical Manual of American Association of Blood Banks.

Tools and Equipment:

Donor interview forms, pens, hemoglobinometer, lysing sticks, microhematocrit reader, heparinized capillary tubes, lancets, microhem. centrifuge, alcohol, scales, thermometers, $CuSO_4$ sp. gr. 1.053 and 1.055

Resources:

Bibliography: 9, 20, 25

Duty: Performing Procedures Related to Blood Bank	**Duty No.** M
	Task No. 11

Task: Take blood pressure and/or pulse rate of donor, using a knowledge of normal limits, to determine suitability of donor.

Achievement Indicators: The learner:	Yes	No
1. Placed blood pressure cuff on upper arm of patient - following explanation of procedure -	____	____
2. Inflated cuff to 140 mm and gradually released pressure -	____	____
3. Listened with stethoscope for pulsating sound -	____	____
4. Noted number at which sound began and noticed needle deflecting with each pulse -	____	____
5. Listened until pulsating sound could not be heard and needle ceased deflecting -	____	____
6. Recorded initial sound, (x) systolic, over final sound, (y) diastolic -	____	____
7. Found pulse with index and middle finger along medial aspect of wrist parallel to thumb -	____	____
8. Counted beats (throb, pulsations) for 1 minute -	____	____
9. Recorded number counted as number of minutes -	____	____
10. Rejected donors with blood pressure below 120/70 or above 160/90 or outside range of institutional policy -	____	____
11. Rejected a donor with pulse outside the limits 50-100 beats per minute (regular) -	____	____

Criteria: Competence in the task will be recgonized when the achievement indicators are successfully performed according to Technical Manual of the American Association of Blood Banks and prevailing laboratory policy.

Tools and Equipment:

Blood pressure cuff, stethoscope, alcohol, pen, pencil

Resources:

Bibliography: 20, 24, 25

Duty: Performing Clerical Duties	**Duty No.** N
	Task No. 1

Task: Log specimens, using recommended forms, ledger, and specimens, to identify patient and specimen type received for testing.

Achievement Indicators: The learner:	Yes	No
1. Employed identification system established by laboratory protocol, entering in log, under date of collection, a minimum of:		
a. name and identification of patient -	____	____
b. room number for in-patient -	____	____
c. laboratory accession number for in- and out-patients -	____	____
d. referring physician -	____	____
e. type of test(s) requested -	____	____
2. Noted date of receipt of specimen in laboratory if other than date of collection -	____	____
3. Described in log or on permanent (including file) copy of request, any condition (e.g., breakage, hemolysis) which rendered specimen unsuitable for processing -	____	____
4. Checked log book of specimens received, against worksheet in testing area -	____	____
5. Requested or arranged for replacement of unsuitable specimens -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory and hospital guidelines.

Tools and Equipment:

Resources:
Bibliography: 3, 19, 23

Teacher Activities	Student Learning Activities
Discussion Questions 1. Why are records important? 2. What if I... you... merchants? 3. Types of identifying information that is practical. What/Why How this exercise: 1. Is to be done. 2. Expected outcomes. 3. Establish validity for this exercise. 1. Present various methods of record-keeping, using as an example: a. class records b. student notebooks c. checkbooks d. school office records (the cards filled out by students when school begins) 2. Demonstrate proper use of records. a. requisitions b. logs or journals c. computer files 1. Prepare requisitions and log sheets to allow students to complete Evaluate quality of exercises (number, penmanship, information thoroughness) done by students.	1. Read recordkeeping assignments, Quality Assurance Practices for Health Laboratories. 2. Practice preparing log sheets using data provided by instructor. 3. Following practice drills complete log sheets with prepared examples from instructor - timed exercise. 4. Write an essay describing how this exercise is a major facet in quality control.

Duty: Performing Clerical Duties	**Duty No.** N
	Task No. 2

Task: Post test results, using laboratory report forms, to prepare lab reports for a patient chart.

Achievement Indicators: The learner:	Yes	No
1. Ascertained that final laboratory report (manual or computerized) contained:		
a. patient identification (number and name) -	____	____
b. name of referring physician -	____	____
c. date of collection -	____	____
d. date of receipt of specimen -	____	____
e. condition of specimen, if judged unsuitable -	____	____
f. type of specimen (inferred or stated) -	____	____
g. type of test(s) requested and performed -	____	____
h. results of laboratory tests, presented in a legible form, to icnlude units of concentration -	____	____
i. normal range(s) adjusted for age (e.g., alkaline phosphatase), sex (e.g., 17-ketosteroids) or time of collection (e.g., post prandial glucose), if appropriate -	____	____
j. identity of technologist performing test -	____	____
k. kdate of reporting -	____	____
l. name and address of laboratory to which specimen was forwarded if testing was conducted outside the reporting laboratory -	____	____
2. Arranged for ORIGINAL copy of report to become a permanent part of patient chart (in-patient) or physician's office file (out-patient) -	____	____
3. Reported, in an appropriate manner, an compromised specimen -	____	____
4. Arranged for replacement of compromised specimen -	____	____

Criteria: Competence in the task will be recognized when the achievemet indicators are performed according to laboratory and hospital guidelines.

Tools and Equipment:

Lab reports, charts (or CRT for input), laboratory files

Resources:

Bibliography: 3, 15, 18

Duty: Performing Clerical Duties	**Duty No.** N
	Task No. 3

Task: Record statistical data, using a typewriter, specified forms and patient test data, to maintain records.

Achievement Indicators: The learner:	Yes	No
1. Participated in computations of statistical data such as tabulating totals of departmental work, workload recording, etc. -	____	____
2. Assisted in preparation of monthly and/or annual reports, to reflect workload of the laboratory (e.g., in-patient vs. out-patient, by laboratory divisions, etc.) as part of the laboratory records on a total hospital statistical report -	____	____
3. Assisted in assembling and analyzing data to establish mean and ranges for controls employed in laboratory tests -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed as directed by the laboratory and hospital policies.

Tools and Equipment:	**Resources:**
Files, calculators or computers, pins	Bibliography: 3, 19, 23

Duty: Performing Clerical Duties | **Duty No.** N | **Task No.** 4

Task: Label slides and other clinical materials, using specified system, to prepare them for temporary or permanent storage.

Achievement Indicators: The learner:	Yes	No
1. Identified slides and other clinical material to correspond to same identification in permanent log form -	____	____
2. Entered specimen details in log book to provide complete patient identification -	____	____
3. Employed a simple accession number which, together with a method of filing, provided easy access to a patient's clinical material -	____	____
4. Labeled slides in a consistent manner:		
a. label at left end of slide -	____	____
b. label not overlapping coverglass (to avoid uneven storage) -	____	____
c. patient identification number entered in same manner on each label, to be easily read on vertical storage of slides; name, room number, physician, data of specimen -	____	____
5. Affixed labels in a manner to avoid their accidential removal -	____	____
6. Labeled jars of clinical material (e.g., surgical or autopsy specimens) in a consistent manner, to permit easy retrieval -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner consistent with hopsital and laboratory protocol.

Tools and Equipment:

Lab pens, pens, labels, jars (assorted sizes), vials

Resources:

Bibliography: 3, 19, 23

Duty: Performing Clerical Duties	**Duty No.** N
	Task No. 5

Task: Store clinical materials, using approved storage areas and containers, to preserve clinical material for future references.

Achievement Indicators: The learner:	Yes	No
1. Stored slides, in slide file drawers, in numerical order:		
a. allowed slides to remain flat in slide folder until mounting media was thoroughly dry, to avoid sticking together of slides while in file -	____	____
b. stored cytology, histology, and autopsy slides in separate files (if applicable) -	____	____
c. stored hematology slides by patient case - peripheral blood identified by number (e.g., 60-81) and bone marrow identified delineated by same number with additional designation (e.g., 60-81 BM) -	____	____
2. Labeled file drawers to reflect contents, for easy retrieval even in absence of department personnel -	____	____
3. Placed jars of clinical material on shelves or in other storage in a manner that avoided unwise stacking and the possibility of breakage, while attempting retrieval of a particular specimen -	____	____
4. Labeled shelves or other storage to reflect contents and renewed labels as some specimens were disposed of and others substituted -	____	____
5. Disposed of old tissue specimens, at the pathologist's direction, and according to regulatory agency guidelines, in a manner consistent with safety procedures -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed in a manner consistent with laboratory and hospital guidelines.

Tools and Equipment:	**Resources:** Bibliography: 3, 19, 23

Duty: Performing Clerical Duties	**Duty No.** N
	Task No. 6

Task: File records of laboratory tests, using laboratory report slips and specified filing equipment, to ensure availability and ready access to test results.

Achievement Indicators: The learner:	Yes	No
1. Filed duplicate copy of laboratory report containing all of patient information reflected on original report, so that specimen could be traced from access to release of report -	____	____
2. Attached physician's written request (for out-patient) to duplicate report in file, or maintained separate file of such requests -	____	____
3. Labeled file drawers to reflect current contents, as unexpected volumes of filing make original designation inappropriate -	____	____
4. Maintained file in order by:		
a. keeping records on same patient in same place, at least for each admission -	____	____
b. carefully replacing records removed for some reason, in appropriate alphabetical or numerical order or date -	____	____
c. avoiding accumulation of current records in places other than in appropriate file, created an inactive file for records more than four months (or aging consistent with laboratory guideline) -	____	____
5. Observed rule of filing system, separating "in-house" patients from patients who have left the hospital, and both from the records on out-patients -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to laboratory guidelines.

Tools and Equipment:	**Resources:**
Files, laboratory records, log books, physician's orders, inactive files	Bibliography: 3, 19, 23

Duty: Using Employability Skills	**Duty No.** 0
	Task No. I

Task: Perform a self-assessment, using knowledge and information, to compile a list of personal attributes.

Achievement Indicators: The learner:

	Yes	No
1. Listed work-related accomplishments-	____	____
2. Listed non-work related accomplishments -	____	____
3. Identified skills and competency attainment -	____	____
4. Identified transferable (portable) skills -	____	____
5. Determined strengths and weaknesses -	____	____
6. Described job liabilities and the affect liabilities have on employment opportunities -	____	____
7. Developed a plan to overcome job liabilities -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:
Goodman, Jane, Judith Hoppin and Ronald Kent, "First Steps" in Opening Doors: A Practical Guide for Job Hunting. Continuum Center, Oakland University, 1984, pp. 7-14.

Duty: Using Employability Skills

Duty No. 0

Task No. 2

Task: Perform a self-assessment, using knowledge and information, to identify areas of work that will provide personal job satisfaction.

Achievement Indicators:

The learner	Yes	No
1. Listed personal job values -	____	____
2. Rated each job value -	____	____
3. Listed enjoyable activities/interests -	____	____

Criteria: Competence in the taks will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:
Ibid, pp. 16-20

Duty: Using Employability Skills | **Duty No.** 0 | **Task No.** 3

Task: Perform a self-assessment, using knowledge and information, to determine methods to reduce levels of stress.

Achievement Indicators: The learner:

	Yes	No
1. Identified stages of grief that result in stress -	____	____
2. Identified factors that reduced levels of stress -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Ibid, pp. 21-23.

Duty: Using Employability Skills

Duty No. 0

Task No. 4

Task: Compile an occupational profile, using reference materials, to determine the characteristics, requirements, and employment outlook of an occupation.

Achievement Indicators: The learner:

	Yes	No
1. Described:		
a. Main job duties	____	____
b. Places of employment -	____	____
c. Physical demands -	____	____
d. Working (environmental) conditions -	____	____
e. Educational requirements -	____	____
f. Wage and fringe benefit information -	____	____
g. Local, regional and national employment outlook -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Dictionary of Occupational Titles (D.O.T.).

Goodman, Jane, Judith Hoppin and Ronald Kent, "Making Decisions," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 27-34.

Michigan Occupational Information System (M.O.I.S.)

Duty: Using Employability Skills

Duty No. 0

Task No. 5

Task: Investigate non-wage job characteristics, using available resources, to identify significant job factors.

Achievement Indicators:

The learner	Yes	No
1. Listed and described:		
a. Union affiliation -	____	____
b. Apprenticeship opportunities -	____	____
c. Occupational hazards -	____	____
d. Shift requirements -	____	____

Criteria:

Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Dictionary of Occupational Titles (D.O.T.).
Goodman, Jane, Judith Hoppin and Ronald Kent, "Making Decisions," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 27-34.
Michigan Occupational Information System (M.O.I.S.)

Duty: Using Employability Skills

Duty No. 0

Task No. 6

Task: Develop goals, using knowledge, to determine career objective(s).

Achievement Indicators: The learner:

	Yes	No
1. Listed short-term goals	____	____
2. Listed long-term goals -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:
Ibid, pp. 30-31.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 7

Task: Perform a job search, using information, to identify employment opportunities.

Achievement Indicators: The learner:

	Yes	No
1. Determined geographic boundaries for job search -	____	____
2. Listed types of potential places of employment -	____	____
3. Developed a list of prime sources of information concerning opportunities for employment -- advertised and unadvertised -	____	____
4. Gathered information about advertised and unadvertised job openings -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppins and Ronald Kent, "Planning the Campaign," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 37-47

Duty: Using Employability Skills | **Duty No.** 0 | **Task No.** 8

Task: Participate in an information interview, using knowledge and resources, to obtain information about a job from an employer.

Achievement Indicators:

The learner:	Yes	No
1. Identified a job within the area of occupational interest -	____	____
2. Prepared a list of organizations that employ people to perform the identified job -	____	____
3. Scheduled an interview appointment with an employer at one of the organizations -	____	____
4. Prepared a list of questions for the interview -	____	____
5. Conducted the interview -	____	____
6. Prepared a follow-up letter to mail, after the interview, to the employer		

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppin and Ronald Kent, "Planning the Job Campaign," Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 44-45.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 9

Task: Complete a social security form, using information, to apply for a social security number.

Achievement Indicators:

The learner:	Yes	No
1. Contacted appropriate office to secure form -	____	____
2. followed instructions on form--	____	____
3. Filled in each space on the form with the correct information -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions

Tools and Equipment:	**Resources:** "Handling the Paperwork," Employability Skills Guide #6, MSU.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 10

Task: Contact an employer, using a telephone, to pursue potential employment opportunities.

Achievement Indicators:

The learner:	Yes	No
1. Greeted receptionist -	____	____
2. Identified self and reason for phone call -	____	____
3. Asked to speak to appropriate person -	____	____
4. Arranged, if necessary, a time to call back -	____	____

Criteria: Competence in the takd will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppins, and Ronald Kent, "Communicating with Employers," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 54-57.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 11

Task:
Complete a job application, using personal notes, to apply for employment.

Achievement Indicators:

The learner:	Yes	No
1. Followed the directions specified on the application form. -	____	____
2. Filled in each space where applicable, with the correct information -	____	____
3. Used a pen or typewriter to fill in application information -	____	____
4. Filled out the application neatly -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppins and Ronald Kent, "Communicating with Employers," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 61-64

Duty: Using Employability Skills

Duty No. 0

Task No. 12

Task: Prepare a resume, using personal information, to apply for a job.

Achievement Indicators:

The learner:	Yes	No
1. Listed name, address, and telephone number -	____	____
2. Identified career objective -	____	____
3. Listed work experiences	____	____
4. Described job-related experiences -	____	____
5. Provided information about education -	____	____
6. Listed military experence, if acquired -	____	____
7. Described home/community activities -	____	____
8. Listed membership in work-related organizations/ associations -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppins and Ronald Kent, "Communicating with Employers," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 58-59, 65-7

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 13

Task: Write a letter, using personal notes, to apply for a position.

Achievement Indicators: The learner:	Yes	No
1. Included:		
a. Name, address, phone number -	____	____
b. Date -	____	____
c. Name, title, firm, address of person to whom the letter is being sent -	____	____
d. Salutation -	____	____
2. Indicated, in paragraph one:		
a. An awareness of the business -	____	____
b. A reference to an ability/skill that will benefit the company -	____	____
3. Emphasized experience, abilities, accomplishments, in paragraph two -	____	____
4. Identified strenghts/special training in paragraph three -	____	____
5. Included a follow-up plan in paragraph four -	____	____
6. Included complimentary closing -	____	____
7. Signed letter -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppin and Ronald Kent, "Communicating with Employers," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 72-73.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 14

Task: Demonstrate appropriate dress, using a knowledge of job requirements, to comply with standards of on-the-job attire and grooming.

Achievement Indicators: The learner:	Yes	No
1. Described and/or dressed in the attire of the appropriate occupational area, including:		
a. Grooming -	____	____
b. Health and safety equipment -	____	____
c. Uniforms -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppin and Ronald Kent, "The Job Interview," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 77-96.

Duty: Using Employability Skills | **Duty No.** 0 | **Task No.** 15

Task: Interview for a job, using communication skills, to secure employment.

Achievement Indicators: The learner:

	Yes	No
1. Demonstrated appropriate characteristics for job applicants including:		
a. Attire -	____	____
b. Grooming -	____	____
c. Conduct -	____	____
2. Demonstrated correct usage of interviewing techniques -	____	____
3. Prepared a list of questions to ask the interviewer(s) -	____	____
4. Prepared a follow-up letter to mail, after the interview, to the interviewer -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppin and Ronald Kent, "The Job Interview," in Opening Doors: A Practicle Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 77-96.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 16

Task: Contact a job interviewer, using a telephone, to accept/reject a job.

Achievement Indicators: The learner:	Yes	No
1. Spoke with interviewer who offered the job -	____	____
2. Identified self -	____	____
3. Accepted offer, if applicable -	____	____
4. Found out starting date and time, if appropriate -	____	____
5. Rejected offer courteously and politely, if applicable -	____	____
6. Gave reason for rejection, if applicable -	____	____
7. Concluded conversation correctly -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructor.

Tools and Equipment:	**Resources:**
	"Getting the Job," Employability Skills Guide #9, MSU. Ibid, pp. 77-96

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 17

Task: Complete forms, using information, to withhold city, state, and federal taxes.

Achievement indicators: The learner:	Yes	No
1. Completed city tax form correctly -	____	____
2. Completed state tax form correctly -	____	____
3. Completed federal tax form correctly -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:	**Resources:**

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 18

Task: Describe performance evaluation measurements, using knowledge, to identify behavior/attitudes that employers expect employees to exhibit on-the-job.

Achievement Indicators: The learner:	Yes	No
1. Listed and described the methods to achieve successful working relationships -	____	____
2. Listed and defined importance of:		
a. Reliability -	____	____
b. Punctuality -	____	____
c. Quality -	____	____
d. Quantity -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:	**Resources:**
	Goodman, Jane, Judith Hoppin and Ronald Kent, "Opening the Door to Your Future," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 99-100.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 19

Task: Perform a continuing education program search, using available resources, to identify opportunities for retraining, skills upgrading, and career advancement.

Achievement Indicators: The learner:	Yes	No
1. Described types and sources of continuing education programs for an occupation -	____	____
2. Related information to career alternatives -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:

Goodman, Jane, Judith Hoppin and Ronald Kent, "Opening the Door to Your Future," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, P. 101.

Duty: Using Employability Skills	**Duty No.** 0
	Task No. 20

Task: Analyze career information, using available resources, to identify the opportunities for advancement that exist within an occupation.

Achievement Indicators: The learner:

	Yes	No
I. Described the career stages associated with the occupational area:		
a. Listed jobs, entry through advanced levels -	____	____
b. Gave examples of tasks that employees in the occupation are required to perform -	____	____
c. Identified tools/equipment that employees in the occupation use -	____	____
d. Made reference to the relationship of the job(s) to data, people, things -	____	____
e. Made reference to education and/or on-the-job training needed to attain career mobility -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to instructions.

Tools and Equipment:

Resources:

Dictionary of Occupational Titles (D.O.T.).

Goodman, Jane, Judith Hoppin and Ronald Kent, "Opening the Door to Your Future," in Opening Doors: A Practical Guide for Job Hunting, Continuum Center, Oakland University, 1984, pp. 99-102.

Michigan Occupational Information System (M.O.I.S.)

Duty: Using Employability Skills | **Duty No.** 0 | **Task No.** 21

Task: Describe job resignation/dismissal practice, using knowledge, to identify positive methods for terminating an employment situation.

Achievement Indicators: The learner:

	Yes	No
1. Described practices for resigning from a job:		
a. Gave two weeks to a months notice -	____	____
b. Specified a positive reason for leaving the employment situation -	____	____
2. Described practices for job dismissal (laid off, released):		
a. Asked the employer for a letter of reference, if laid off -	____	____
b. Talked with the employer to discover what was the problem, if released -	____	____

Criteria: Competence in the task will be recognized when the achievement indicators are successfully performed according to the instructions.

Tools and Equipment:

Resources:
"Knowing the Score," Employability Skills, Guide #10, MSU.

STUDENT ACHIEVEMENT RECORD

LABORATORY DIAGNOSTIC SERVICES:
MEDICAL LABORATORY ASSISTANT

STUDENT _____

INSTRUCTIONS:

Mark each student's level of competence according to the following guide:

LEVEL	GUIDE
1	Student has been exposed to task
2	Task accomplished with assistance
3	Task accomplished to criteria by student
4	Ability to teach or demonstrate the task to others

TASK	LEVEL	DATE
A. EMPLOYING LABORATORY SAFETY PROCEDURES		
1. Select safety supplies.		
2. Operate safety equipment.		
3. Employ precautions, to handle hazardous reagents.		
4. Employ precautions, to handle hot materials.		
5. Employ precautions, to handle sharp objects.		
6. Employ precautions, to prevent contamination.		
B. COMMUNICATING WITH EMPLOYESS AND PATIENTS		
1. Introduce self.		
2. Take a message.		
3. Place a call.		
4. Answer telephone.		
5. Demonstrate verbal/non-verbal communication skill.		
6. Demonstrate professional conduct.		

TASK	LEVEL	DATE
C. USING BASIC LABORATORY SKILLS		
1. Select laboratory glassware.		
2. Perform basic calculation(s).		
3. Weigh out chemical reagents.		
4. Measure volume of clinical material or labortory - solutions.		
5. Measure length of area.		
6. Mix chemical(s).		
7. Store prepared solution(s).		
8. Use commercial pH indicator paper.		
9. Operate a pH meter.		
10. Measure length.		
11. Measure temperature.		
12. Check alcohol reagents.		
13. Use a compound microscope.		
14. Focus with oil immersion lens.		
15. Clean laboratory glassware.		
16. Separate substances by filtration.		
17. Titrate solutions.		
D. OPERATING LABORATORY EQUIPMENT		
1. Operate Bunsen/Fisher burner.		
2. Calibrate burette.		
3. Weigh with balances.		
4. Operate centrifuge.		
5. Operate timing device.		
E. COLLECTING SPECIMENS		
1. Select blood collection equipment.		
2. Collect specimen(s).		
3. Obtain blood sample, using appropriate venipuncture and capillary puncture supplies.		
4. Obtain a blood sample, using capillary punture supplies.		

TASK	LEVEL	DATE
F. PROVIDING CARE AND MAINTENANCE OF EQUIPMENT AND SUPPLIES		
1. Prepare laboratory equipment.		
2. Perform maintenance procedures and minor repairs.		
3. Perform a laboratory test.		
4. Record temperature of storage units or testing apparatus.		
5. Investigate temperature or test variations.		
6. Wash laboratory equipment.		
7. Sterilize laboratory equipment.		
8. Record performance of maintenance or quality control procedures.		
9. Inventory supplies and equipment.		
10. Prepare requisitions.		
G. PREPARING SPECIMENS FOR ANALYSIS		
1. Evaluate specimens.		
2. Sort specimens.		
3. Report unusual or special conditions of the specimen.		
4. Label specimen(s) and tube(s).		
5. Heat tubes or test samples.		
6. Separate specimen(s).		
7. Prepare specimen.		
8. Affix clinical specimens onto clean glass slides.		
H. PERFORMING MEATOLOGIC PROCEUDURES		
1. Prepare sample(s).		
2. Preform hemglobin test.		
3. Calculate WBC.		
4. Perform RBC.		
5. Perform hematocrit (macro- and micro-).		
6. Perform routine hematology tests.		
7. Prepare a smear for differentail count.		
8. Examine blood smear.		
9. Perform a hemoglobin test.		

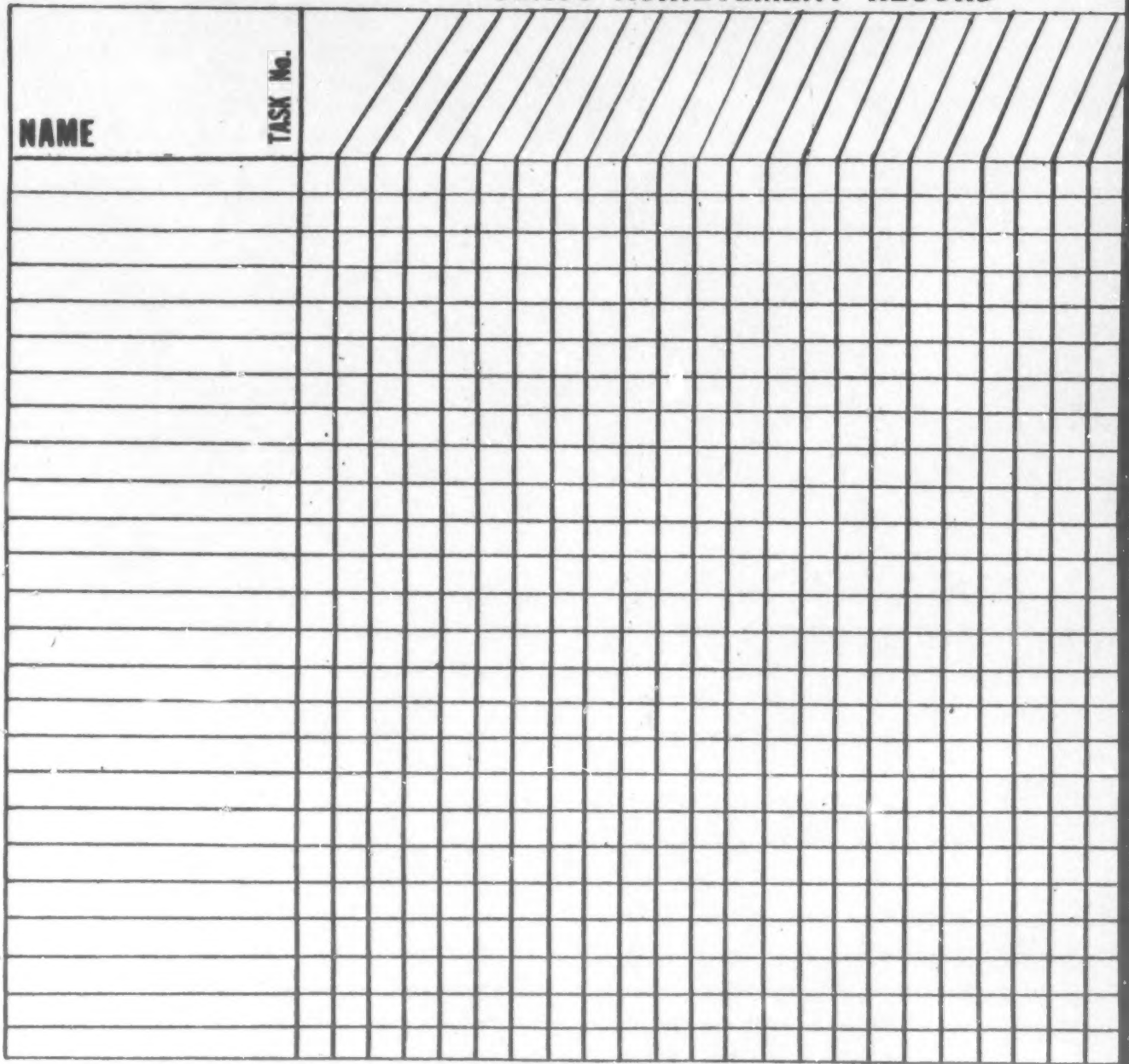
TASK	LEVEL	DATE
H. PERFORMING HEMATOLOGIC PROCEDURES (CONTINUED)		
10. Calculate erythrocyte indices.		
11. Perform routine coagulation procedures.		
12. Perform bleeding time.		
13. Perform clot retration.		
14. Perform erythrocyte sedimentation rate (Wintrobe or Westergren).		
15. Perform reticulocyte count.		
16. Perform spinal fluid cell count.		
17. Perform a direct platelet count.		
I. PERFORMING URINALYSIS		
1. Observe color and appearance of urine specimen.		
2. Perform dipstick analysis.		
3. Evaluate urinary sediment.		
J. PERFORMING CHEMISTRY ANALYSIS		
1. Process a specimen.		
2. Prepare a blood sample and body fluid for electrophoresis determination.		
3. Analyze blood or body fluid sample(s).		
4. Analyze blood or urine specimen.		
5. Prepare protein free filtrate.		
6. Analyze blood or body fluids, to determine amounts of glucose.		
7. Analyze bood or body fluids, to determine amount of cholesterol.		
8. Perform glucose tolerance test.		
9. Perform bilirubin test (direct and indirect).		
10. Analyze blood or body fluids, to determine amounts of urea.		
11. Measure blood or body fluids.		
12. Perform calcium test (titration).		

TASK	LEVEL	DATE
J. PERFORMING CHEMISTRY ANALYSIS (CONTINUED)		
13. Perform chlorides test.		
14. Perform amylase test.		
15. Analyze blood samples, to determine amount of CO_2 and pH in blood.		
16. Analyze blood or body fluids, to detect presence of isotopes injected or ingested.		
K. PERFORMING MICROBIOLOGY PROCEDURES		
1. Prepare sterile media.		
2. Store sterile media.		
3. Inocluate culture media.		
4. Incubate inoculated media or designated specimens.		
5. Examine inoculated culture media or designated specimens.		
6. Initiate subcultures.		
7. Perform mycological or parasitological evaluation.		
8. Evaluate viral cultures.		
9. Perform antibiotic sensitivity test.		
10. Discard contaminated media and specimens.		
11. Maintian stock cultures.		
12. Prepare slides by Gram stain method.		
13. Stain slides by AFB method.		
14. Stain smears.		
15. Examine stained slides (smears).		
16. Stain slides by India Ink method.		
17. Prepare parasitological "wet prep" slides.		
18. Process specimens for inoculation of T.B. organisms.		
L. PERFORMING SEROLOGIC PROCEDURES		
1. Prepare samples of blood or body fluids.		
2. Examine prepared slides of blood or body fluids.		
3. Perform blood samples.		
4. Perform VDRL, RPR or other similar tests.		

TASK	LEVEL	DATE
L. PERFORMING SEROLOGIC PROCEDURES		
5. Perform blood or urine samples.		
6. Perform semen analysis.		
M. PERFORMING BLOOD BANK PROCEDURES.		
1. Store blood products.		
2. Prepare blood products, to provide products for transfusion.		
3. Prepare blood products, to provide leukocytes and packelcells (erthrocytes) and plasma for transfusion.		
4. Freeze red cells.		
5. Inspect units of blood.		
6. Group or type blood samples.		
7. Perform cross-match test.		
8. Dispose of used blood containers and pilot tubes.		
9. Perform first aid for shock.		
10. Complete interview and basic testing of donor.		
11. Take blood pressure and/or pulse rate of donor.		
N. PERFORMING CLERICAL DUTIES		
1. Log specimens.		
2. Post test results.		
3. Record statistical data.		
4. Label slides and other clinical materials.		
5. Store clinical materials.		
6. File records of laboratory tests.		
O. USING EMPLOYABILITY SKILLS		
1. Perform a self-assessment, to compile a list of personal attributes.		
2. Perform a self-assessment, to identify areas of work that will probide personal job satisfaction.		
3. Perform a self-assessment, to determine methods to reduce levels of stress.		

TASK	LEVEL	DATE
0. USING EMPLOYABILITY SKILLS		
4. Compile an occupational profile.		
5. Investigate non-wage job characteristics.		
6. Develop goals.		
7. Perform a job search.		
8. Participate in an information interview.		
9. Complete a social security form.		
10. Contact an employer.		
11. Complete a job application.		
12. Prepare a resume.		
13. Write a letter.		
14. Demonstrate appropriate dress.		
15. Interview for a job.		
16. Contact a job interviewer.		
17. Complete forms.		
18. Describe performance evaluation measurements.		
19. Perform a continuing education program search.		
20. Analyze career information.		
21. Describe job resignation/dismissal.		

CLASS ACHIEVEMENT RECORD



MEDICAL LABORATORY ASSISTANT
TOOL/EQUIPMENT LIST

Computer

Pipettes, volumetric and graduate

Slides

Timers

Syringes, vacutainer tubes, holders (disposable)

Petri dish racks

Petri dish plastic (disposable)

Chloridometer

Sed rate tubes

Tray, blood collecting

Seditubes and sediracks

Shaker or mixer chemical

Refrigerator (explosive proof)

Test tubes (various sizes) pyrex

Trays, staining

Cleaning wires

Centrifuges (2 micro centrifuges); (2 sero centrifuge or 4 combination triac which can be used in hematology, urinalysis, or chemistry)

Blood collection tray

Washers, pipette

Glassware beakers (24), flasks - volumetric (12); Florence (12); Erlenmeyer (12)

Vacutainers tube (disposable), assorted

Blood drawing chair

WBC pipette, HB - RBC

Aliquot mixer

Needles (disposable) - multiple and single draw needles

Racks, drying

Bath, water (standard) (blood bank - (1))

Ringstands, base, rod

Spectrophotometer cuvettes

Coverslips (regular - 22mm x 22mm; 22mm x 30mm)

Coverslips (hemacytometer)

Microhematocrit reader

Rinser, pipette

Still barnstead

Glucose analyzer

Pipet shakers

Sedimentation rate tubes

Spectrophotometer

Rh view boxes

Lab thermometers

Blood chemistry (Accustat with modules)

Heat blocks or water baths (chemistry, microbiology)

Typewriters

Stethoscopes

Incubator and Thermometer

Volumetric blood gas apparatus

Burners, Bunsen or Fisher, Strikers Safety

Hot Plates

Counter, hand tally

Hood

Balances (2 analytical, 10 top loading centrigram

Flame photometer (electric)

Urinometer, midget

Weights, analytical (set) with partial weight

Emergency shower

Unopettes (platelets - Hemoglobin, RBC, WBC) (disposable)

Blood pressure cuffs (sphygmomanometer)

Coulter counter (automatic blood, analyzer or hematology analyzer) Coulter

Sterilizer
Blanket, fire
Hemacytometer
Stop watches
Burette
Washer, Wintrobe (sedrate tube)
Counter, differential
Micro capillary reader
Medical microscopes with in-base
  binocular microscope
  phase microscope kit
  fluorescent microscope illuminator
    with light polarizer
  polarizing microscope kits
Meter pH
Eye wash
Dispenser bottles
Autoclave
Demineralizer
Disc-dispensers
Burette clamps
Auto slide (diff.) stainer
Urinometer-midget
Metric rulers
Electrophoersis chamber
Tourniquet
Atomic absorption spectrophotometer
Densitometer
Platelet counters
Laboratory demonstration unit
  portable
Blood pressure training arm
Venipuncture training arm
Chemical blood for training arm
Chemical storage cabinet (fireproof)
Bottles 500 ml (brown)
CPR training mannequins, adults
CPR training mannequins, baby
Differential counter

Disposable Equipment

Kilit ampules (for autoclave)
Antibiotic dishes
Petri dishes
Red, white unopettes
Media
Controlled drop pasteur pipettes
Blood culture bottles
Blood culture collection sets
Stain kits
Lancets (micro pipette and tubing)
Autoclave envelopes
Alcohol swabs
Blood collecting capillary pipettes
Blood staining kits
Capillary tubes deparinized and
  non-heparinized
Brown storage bottles
Polyethylene storage bottles
Bio-mailers (assorted)
Microtube sealant
Test tube brushes
Clinical chemicals
Cotton swabs
Infant heat warmers
Band aids
Assorted labels
Ammonia ampules
Lab markers (permanent "Sharpie"™)
Indicator tape
Biohazard bags
Biohazard containers
Isolation gowns, masks, gloves

Kits

Uritol

Pregnancy test - pregnatrol/
Pregnosticon

Centrifuge tubes disposable

Spec. containers, disposable

Chemstrip or some similar product
Labstix, multistix, hemacult

Sickle-trol

ABO groupings - Anti-sera, A, B, RhD

Rh control test (anti D)

Anti-human globulin

(And many other chemical reagents)

Rheumanosticon

Monosticon

Various chemicals

Dehydrated media

Glucose tolerance test beverage
Glucola (brand or similar prepared
g.t.t. beverage)

Various stains

Wright's stain

Malachite green

Safranin

Iodine gin

Genetial violet

Methylene N Blue

Giemsa

Carbo-fuschin

India ink

Indicies calculator

Alcohol - 95%, 70%

Graph paper

HCl

HNO_3

H_2SO_4

Clorox

Zepharen Chloride

Phenol

Lens cleaner (Fisher Scientific)

Lens paper

K-Dichromate

Na Tichromate

Alconox
Red, blue litmus, nitrazine paper,
hydrion paper

Drabkin's reagent

Acetic acid

Sodium chloride reagent grade

Thoma pipet - red and white

Trichloroacetic acid

Chemistry standards and controls

EDTA soln

Syringes

Hypodermic needles - 20G, 21G -
1 in., 1½ in.

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BOARD OF REGISTRY
CERTIFICATION EXAMINATION
ELIGIBILITY REQUIREMENTS

(The requirements and fees stated herein are subject to change without notice.)

The Board of Registry examinations are administered on the third Friday of February and August. The dates of administration for each category are noted with the requirements below. The application fee for the Generalists and Categorical Technologist level is $50.00. The application fee for the Specialist level is $70.00. Applications must be received by the first working day of October for the February examination and the first working day of April for the August examination. The deadline date for the Specialist in Blood Banking examination is July 1 as indicated on the back of the Specialist in Blood Banking application form. Please include your social security number with your application and correspondence. Please contact the Board of Registry office at P.O. Box 12270, Chicago, Illinois, 60612 for application forms and general information.

Note:

Foreign Applicants: If a candidate is basing his/her eligibility on a degree from a foreign university, the official transcript or copy must first be evaluated by the International Education Research Foundation, Inc., P.O. Box 24040, Los Angeles, California, 90024. The evaluation must be submitted with the application for certification examination. The Board of Registry does not accept clinical laboratory experience obtained in a foreign country. Foreign medical technology clinical training programs are recognized as equivalent to one year of full time clinical laboratory experience obtained in the United States and may be applied toward one of the five (5) years required for eligibility for the MT or MLT examinations. The other four years of acceptable clinical laboratory experience must be completed in the United States.

The Education Received from a CAHEA (Committee on Allied Health Education and Accreditation) accredited program is acceptable for a period of five (5) years from the date of completion.

Full Time Experience is defined as a minimum of thirty-five (35) hours per week. Individuals who are currently employed in the area for which they are applying for examination eligibility may be permitted to utilize part-time experience to meet the work experience requirements. Please contact the Board of Registry office for specific information regarding the acceptability of part-time experience prior to applying.

GENERAL CERTIFICATION
MEDICAL LABORATORY TECHNICIAN, MLT(ASCP)

FEBRUARY AND AUGUST

1. Associate degree from a CAHEA accredited Medical Laboratory Technician program including courses in chemistry and biology, OR
2. Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university, including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND five years full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology, and Clinical Microscopy within the last seven years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist, OR
3. Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university, including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND graduation from a military medical laboratory specialist program (MOS 92B30 or 92B2T; NEC 8506; AFSC 90450, 92450, 90470 or 92470), OR
4. 30 semester hour (45 quarter hours) of academic credit from a regionally accredited college/university, including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology IN ADDITION TO successful completion of a CAHEA accredited MLT-C program (previously identified as a Laboratory Assistant program), OR
5. 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university, INCLUDING successful completion of a CAHEA accredited MLT-C program and courses in biology and chemistry, OR
6. Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university, including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND CLA(ASCP) certification, OR
7. High school graduation (or equivalent) AND successful completion of a CAHEA accredited MLT-C program and three years full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology and Clinical Microscopy within the last five (5) years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist, OR

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8. High school graduation (or equivalent) AND successful completion of a military medical laboratory specialist program (MOS 92B30 or 92B2T; NEC 8506; AFSC 90450, 92450, 90470 or 92470) and three years full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology and Clinical Microscopy within the last five (5) years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

MEDICAL TECHNOLOGIST, MT(ASCP)

FEBRUARY AND AUGUST

1. Baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND successful completion of a CAHEA accredited Medical Technology program, OR
2. MLT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND three years of full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology and Clinical Microscopy within the last seven years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist, OR
3. CLA(ASCP) certification, AND a baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND four years of full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology and Clinical Microscopy within the last seven years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist, OR
4. Baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND five years of full time acceptable clinical laboratory experience in Blood Banking, Chemistry, Hematology, Microbiology, Immunology and Clinical Microscopy within the last seven years. At least two years must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

CATEGORICAL CERTIFICATION

Categorical certification examinations for the Technologist in Blood Banking, Technologist in Chemistry, Technologist in Hematology, Technologist in Immunology, and Technologist in Microbiology are considered equivalent to the Medical Technologist level for the specific discipline.

TECHNOLOGIST IN BLOOD BANKING, BB(ASCP)

AUGUST ONLY

1. MT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, OR
2. Baccalaureate degree from a regionally accredited college/university, with a major in biological science or chemistry, or baccalaureate degree from a regionally accredited college/university with a combination of 30 semester hours (45 quarter hours) of biology and chemistry, AND two years full time acceptable clinical laboratory experience in blood banking within the last five years. These two years of experience must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

(Contact the Board of Registry office for further information regarding the specific areas of experience required before submitting your application.)

TECHNOLOGIST IN CHEMISTRY, C(ASCP)

AUGUST ONLY

1. MT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, OR
2. Baccalaureate degree from a regionally accredited college/university with a major in chemistry, or a baccalaureate degree with 24 semester hours (36 quarter hours) of chemistry, AND one year full time acceptable clinical laboratory experience in chemistry within the last three years. This year of experience must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

(Contact the Board of Registry office for further information regarding the specific areas of experience required before submitting your application.)

TECHNOLOGIST IN HEMATOLOGY, H(ASCP)

AUGUST ONLY

1. MT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, OR
2. Baccalaureate degree from a regionally accredited college/university, with a major in biological sciences or chemistry, or baccalaureate degree from a regionally accredited college/university with a combination of 30 semester hours (45 quarter hours) of biology and chemistry, AND two years full time acceptable clinical laboratory experience in hematology within the last five years. These two years of experience must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

   (Contact the Board of Registry office for further information regarding the specific areas of experience required before submitting your application.)

TECHNOLOGIST IN IMMUNOLOGY, I(ASCP)

AUGUST ONLY

(To be administered in alternate uneven years — 1985, 1987, etc.)

1. MT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, OR
2. Baccalaureate degree from a regionally accredited college/university, with a major in biological science or chemistry, or a baccalaureate degree from a regionally accredited college/university with a combination of 30 semester hours (45 quarter hours) of immunology, biology, microbiology and chemistry, AND two years of full time acceptable clinical laboratory experience involving testing components of the immune system and/or using immunological techniques within the last five years. These two years of experience must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

TECHNOLOGIST IN MICROBIOLOGY, M(ASCP)

AUGUST ONLY

1. MT(ASCP) certification AND a baccalaureate degree from a regionally accredited college/university, OR
2. Baccalaureate degree from a regionally accredited college/university with a major in microbiology, or baccalaureate degree with 30 semester hours (45 quarter hours) of biological sciences including at least 20 semester hours (30 quarter hours) in microbiology, AND one year full time acceptable clinical laboratory experience in microbiology within the last three years. This year of experience must be under the supervision of a pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

CYTOTECHNOLOGIST, CT(ASCP)

FEBRUARY AND AUGUST

1. Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university with 14 semester hours (21 quarter hours) in the biologic sciences, AND successful completion of a 12-month CAHEA accredited Cytotechnology program, OR
2. Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university with 14 semester hours (21 quarter hours) in the biologic sciences, AND five years full time acceptable clinical laboratory experience including cytopreparatory techniques, microscopic analysis and evaluation of the body systems within the last seven years. At least two of these years must be subsequent to the completion of the academic component and at least two years must be under the supervision of a licensed physician who is a pathologist certified, or eligible for certification, by the American Board of Pathology in Anatomic Pathology or has other suitable qualifications acceptable to the Board of Registry.

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